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GRADUATE
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The university makes every effort to ensure the accuracy of the contents of this catalog but reserves the right to make changes at any time without prior notice. Since change is a part of university life, curriculum and program changes will likely occur during the time while the 1994-95 Graduate Studies Catalog is in circulation. Students are advised to consult the following sources for current and specific information:

1. The appropriate university department or advisor.
2. The class schedule, printed three times a year, which includes up-to-date information on courses offered, class hours, class locations, and the latest calendar dates, fees, and registration details.

It is the student's responsibility to learn of and abide by current policies and requirements. In the event of change, every reasonable effort will be made to permit students affected to complete their programs or similar programs.

Statement of Nondiscrimination—Admission to Brigham Young University is nondiscriminatory. The university admits persons of either sex and any race, creed, religion, or national origin who meet university and department academic requirements and agree to abide by the university's standards of conduct and honor code. Qualified handicapped students are admitted.

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Where to Write or Call for Information

General Information on Graduate Education

Office of Graduate Studies
B-356 ASB, (801) 378-4091

Campus Tours Visitors Center VCTR, (801) 378-4678

International Student Office 350 SWKT, (801) 378-2695

Law School Admissions 340 JRCCB, (801) 378-4277

Marriott School of Management 730 TNRB, (801) 378-4123

Records B-150 ASB, (801) 378-2631

Registration B-130 ASB, (801) 378-2824

Scholarships and Awards Individual academic departments

Student Employment Services C-40 ASB, (801) 378-3561

Student Housing On-Campus Housing Office 100 SASB (801) 378-2611 Off-Campus Housing Office 255 ELWC (801) 378-5066

Student Loans Financial Aid Office A-41 ASB, (801) 378-4104

Tests (GRE, GMAT, LSAT, and Miller) Testing Services 265 HGB, (801) 378-6129

Tuition and Fees Cashiers' Office D-155 ASB, (801) 378-7808

Veterans Support Office B-150 ASB, (801) 378-2768

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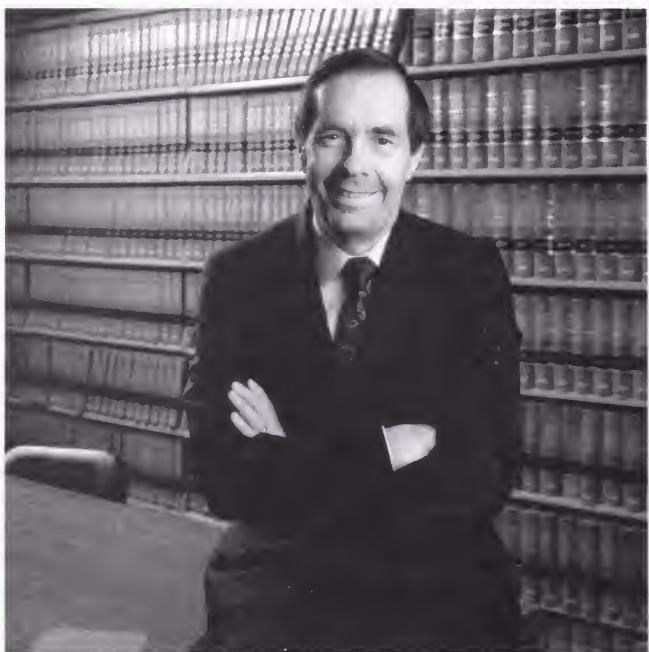
The University

Brigham Young University offers an exceptional educational opportunity for the well-prepared graduate student who is seeking an environment where learning experiences with dedicated scholars characterize graduate study. Established and sponsored by The Church of Jesus Christ of Latter-day Saints, BYU is the largest privately owned university in the United States. The university president, Rex E. Lee, is directly responsible to the board of trustees, led by the president of The Church of Jesus Christ of Latter-day Saints and composed of Church authorities. In a time of constantly changing human values and increased challenges for higher education, BYU holds steadfastly to a singular vision that combines reasoned and revealed learning. Along with extensive undergraduate programs, BYU offers master's and doctoral degrees in a variety of disciplines through fifty-five graduate departments. In addition, the Law School and the Marriott School of Management offer professional graduate degrees.

Founded in 1875 as Brigham Young Academy, the campus has grown from one building to 500 buildings on more than 600 acres. Its first class of twenty-nine students was taught by the academy's founding scholar, Karl G. Maeser. Now nearly 1,400 full-time faculty instruct more than 27,000 students. From its modest beginnings Brigham Young University has grown to become one of the nation's most distinguished institutions of private higher education. At BYU teaching and scholarly research are valued as essential complements of one another. Faculty and students work side by side in collegial scholarship enhanced by mutual commitment to the highest ideals of professional ethics and spiritual values.

Situated at the foot of the beautifully rugged Wasatch Range of the Rocky Mountains and bounded on the west by twenty-three-mile-long Utah Lake, the campus is the focal point of a city of 90,000 and a valley of 250,000. Beyond it to the south and east are spectacular areas of vast sandstone canyons and monoliths, several of which are national parks. Forty-five miles north is Salt Lake City.

The faculty at BYU have been schooled at some of the leading universities of the nation as well as of other countries, and many of them have achieved national and international prominence as teachers and scholars.



From the President . . .

With this Graduate Studies Catalog let me welcome you to the university and to graduate studies. Your successful completion of an undergraduate degree has laid the groundwork for advanced study, but you will find that graduate work offers a new set of experiences. In the main, an undergraduate student tries to assimilate a largely prescribed set of information and skills that are already known by others. An undergraduate student, therefore, is primarily a consumer of knowledge. A graduate student must learn to become a contributor as well as a consumer, someone who expands the world's store of knowledge. Faculty members and graduate students are partners in this important endeavor. Our libraries, laboratories, studios, museums, institutes, and centers will be home to you during the years you spend at Brigham Young University, and they will assist you in your graduate pursuits.

In the pages that follow you can learn about the university's degree requirements, procedures, and course offerings, as well as its distinctive mission and honor code. These pages suggest not only the many spiritual and intellectual opportunities for you here, but also the context in which you will study. Accomplished researchers and scholars will guide your efforts to observe more keenly, to contemplate more deeply, and to see more widely and insightfully than before. They will also assist you, finally, to express with clarity and grace what you have found. This is your challenge and your obligation.

A handwritten signature in black ink, appearing to read "Rex E. Lee".

Rex E. Lee

A b o u t T h i s C a t a l o g

This catalog serves as a graduate supplement to the Brigham Young University Undergraduate Catalog. General information about policies, procedures, services, and personnel that are not specific to graduate study are described in detail in that bulletin.

Introductory and concluding sections of this catalog provide general information about graduate study at Brigham Young University, including details about admissions procedures and requirements that apply across the university. The large center portion of the catalog contains graduate program descriptions and course listings; these appear in alphabetical order by department. Departments at BYU are organized into administrative college units, and graduate programs are the responsibility of college deans and department chairs. These college units are described beginning on page 33. Descriptions there include information about individual college research centers, facilities, and activities. Interdisciplinary facilities and programs appear in the college that has primary responsibility for them.

Policies and requirements in the General Information section of this catalog reflect standards of minimum performance and may be less stringent than those established by individual departments. Most departments have printed materials of their own describing in detail their programs, deadlines, expectations, and opportunities for financial assistance. Therefore, any potential applicants should notify prospective departments of their interest and request printed information from those departments. Because some application deadlines are as early as January for fall admission, and some departments admit new students only once a year, early inquiry is recommended.

Entering students should plan their total study programs early in their first semester because graduate courses may not be offered every term or even every year. The university requires submission of a study list by the end of the student's first term or semester in a program.

The Law School and the Marriott School of Management publish their own bulletins, and they require a different application form than that used for other graduate programs. Furthermore, the Law School follows a different calendar. Prospective applicants to these professional schools should write directly to them.

B r i g h a m Y o u n g U n i v e r s i t y
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Brigham Young University is fully accredited by the Northwest Association of Schools and Colleges. In addition, many professional programs of the university are reviewed, evaluated, and accredited by national and state associations and boards.

For a complete listing of university officers, of organizations that have given full accreditation to related programs at the university, and of educational associations with which the university is affiliated, see the BYU Undergraduate Catalog.

M i s s i o n o f B r i g h a m Y o u n g U n i v e r s i t y

The mission of Brigham Young University—founded, supported, and guided by The Church of Jesus Christ of Latter-day Saints—is to assist individuals in their quest for perfection and eternal life. That assistance should provide a period of intensive learning in a stimulating setting where a commitment to excellence is expected and the full realization of human potential is pursued.

All instruction, programs, and services at BYU, including a wide variety of extracurricular experiences, should make their own contribution toward the balanced development of the total person. Such a broadly prepared individual will not only be capable of meeting personal challenge and change but will also bring strength to others in the tasks of home and family life, social relationships, civic duty, and service to mankind.

To succeed in this mission the university must provide an environment enlightened by living prophets and sustained by those moral virtues which characterize the life and teachings of the Son of God. In that environment these four major educational goals should prevail:

- All students at BYU should be taught the truths of the gospel of Jesus Christ. Any education is inadequate which does not emphasize that His is the only name given under heaven whereby mankind can be saved. Certainly all relationships within the BYU community should reflect devout love of God and a loving, genuine concern for the welfare of our neighbor.
- Because the gospel encourages the pursuit of all truth, students at BYU should receive a broad university education. The arts, letters, and sciences provide the core of such an education, which will help students think clearly, communicate effectively, understand important ideas in their own cultural tradition as well as that of others, and establish clear standards of intellectual integrity.
- In addition to a strong general education, students should also receive instruction in the special fields of their choice. The university cannot provide programs in all possible areas of professional or vocational work, but in those it does provide the preparation must be excellent. Students who graduate from BYU should be capable of competing with the best in their fields.
- Scholarly research and creative endeavor among both faculty and students, including those in selected graduate programs of real consequence, are essential and will be encouraged.

In meeting these objectives BYU's faculty, staff, students, and administrators should also be anxious to make their service and scholarship available to The Church of Jesus Christ of Latter-day Saints in furthering its work worldwide. In an era of limited enrollments, BYU can continue to expand its influence both by encouraging programs that are central to the Church's purposes and by making its resources available to the Church when called upon to do so.

We believe the earnest pursuit of this institutional mission can have a strong effect on the course of higher education and will greatly enlarge Brigham Young University's influence in a world we wish to improve.

S t a n d a r d s o f C o n d u c t

The Brigham Young University Honor Code as established by the university and the board of trustees for all students under its jurisdiction in institutions of higher learning appears in the Graduate Studies Application Form and the BYU Undergraduate Catalog. To know the substance and essence of that code is to know that Brigham Young University is unique among universities. Governed by principles basic to its sponsoring church, The Church of Jesus Christ of Latter-day Saints, it purposefully creates and nurtures an environment in which faith and intellect join together in the pursuit of truth.

All members of the Brigham Young University community—students, faculty, staff, and administrators—agree to live by the values of the gospel of Jesus Christ as found in the standard scriptural works of the Church and the teachings of Church leaders past and present. In essence, then, those who study and work here promise to live lives of kindness, honesty, chastity, virtue, and faithfulness. They promise to do good to their neighbors and to seek after whatever is “virtuous, lovely, or of good report or praiseworthy” (13th Article of Faith).

Such behavior is firmly rooted in eternal principles that have been cherished and articulated by the prophets and other wise men and women throughout the history of civilization. The great thinkers, writers, artists, statesmen, and scientists have taught the importance of life with honor. Beyond the profound thoughts of these men and women, however, are the sacred, inspired writings of God’s prophets. Although good principles can be found in the best of human creations, the ultimate power of these and all true principles is found in the gospel of Jesus Christ.

In practical terms, this means a high standard of conduct is expected of those who join the university community. As sons and daughters of God, all at BYU must strive to grow steadily in faith, intelligence, love, and integrity. All agree to follow the moral teachings of Jesus Christ and the living prophets, and to be honorable and compassionate in their dealings with others. All agree to observe in letter and spirit the principles of health contained in the Word of Wisdom, specifically, to abstain from alcohol, tobacco, tea, and coffee, and from the abuse of drugs and other harmful substances. All agree to be honest in work and in human associations, never taking unfair advantage of others, never representing the work of others as their own, endeavoring to help others to reach their highest goals.

Honor Code

Students and faculty members at Brigham Young University have prepared the Honor Code, recognizing that it is a covenant between each person and all other members of the community, a covenant by which the community grants the privileges and opportunities of citizenship and each person within the community accepts two fundamental responsibilities: (1) to maintain personal integrity by living the code and (2) to maintain the integrity of the community by helping others live the code.

The successful functioning of the Honor Code, indeed of the university itself, depends on mutual confidence and trust among students, faculty members, and staff. Unless each is assured that the other will

uphold the compact, the code will fail and the university will be diminished. Moreover, students and faculty members share a joint responsibility for hearing and evaluating reports of Honor Code infractions.

The university's very being is at stake in this matter. Its certification that a person has completed a class, a course of study, or the requirements for a degree is without value if the person obtained that certification through dishonesty. Similarly, a faculty member's name and university affiliation on the report of a piece of research must signify that the work and the report are honest. Examination papers, laboratory work, essays, theses, projects, research tools, and all other kinds of work for classes and degrees are to be prepared with no use having been made of unauthorized or undocumented materials of any kind. Students are not to give or receive aid in examinations or in class work where such is not permitted. Any individual violation of the Honor Code compromises every member of the community; therefore, the entire community has a deep-rooted investment in the honesty of every person at BYU.

In essence, then, a scholarly publication, grade, certification, or diploma from Brigham Young University should and must have special and particular significance with regard to honor.

Dress and Grooming Standards

The attire and grooming of both men and women should always be modest, neat, clean, and appropriate. See the Graduate Studies Application and the BYU Undergraduate Catalog for a detailed description of specific requirements. Registration at BYU constitutes an affirmative consent to abide by these standards and to represent the university and its sponsoring church in a manner that is becoming and dignified.

Continuing Ecclesiastical Endorsement

All undergraduate and graduate students planning to register the following fall for University credit, including thesis hours, internships, or off-campus programs, must have an annual continuing ecclesiastical endorsement. LDS students may be endorsed **only** by the bishop of their ward of residence during the winter semester. Non-LDS students receive the endorsement from an ecclesiastical leader of their choice or from Student Life (380 SWKT). The endorsement deadline is April 1 of each year, after which there will be a \$20 late fee. No student will be able to register for fall or subsequent semesters or terms without this new endorsement.

Requirements

All students must abide by the Honor Code and the Dress and Grooming Standards. LDS students must fulfill their duty in The Church of Jesus Christ of Latter-day Saints, attend Church meetings, and abide by the rules and standards of the Church.

Withdrawn Ecclesiastical Endorsement

The ecclesiastical endorsement may be withdrawn at any time by a student's ecclesiastical leader. When an endorsement is withdrawn, the student will be required to discontinue enrollment at the university. The decision to withdraw an ecclesiastical endorsement may be appealed first to the responsible stake president. In the case of a decision adverse to the student at the stake president level, an appeal may be taken to the Honor Code Office.

**G r a d u a t e S t u d y a t
B r i g h a m Y o u n g U n i v e r s i t y**

Dean: Addie Fuhriman, Professor of Psychology, B-380 ASB, 378-4465

A university is a place where men and women of character meet minds and ideas that have shaped and will continue to shape human experience in significant ways. It is a place where people read and think and create and analyze, and where they give expression to ideas. It is a place of intellectual and moral broadening and deepening. It is a place where people contribute new knowledge and arrive at new levels of understanding.

In its statement of the principles of graduate education at Brigham Young University, the Graduate Council defines the essence of graduate study as "insight, seeing with 'new' eyes, hearing with 'new' ears, heightened perception leading to broader and deeper conception." Furthermore, the council states,

The measure of the quality of our graduate programs will not be how many students are involved, not how many jobs are available, nor for what salaries graduates are hired. Rather, it will be the degree to which the graduate work brings the student to new perspectives, the extent to which the experience gathers the practical within the theoretical, the extent to which programs enlighten necessary skills with universal understanding, the extent to which they lead students to the theoretical life—a life in which one learns not only to do, but to observe, to contemplate, to comprehend, to understand, and to see widely and clearly, and, finally, to express what has been found.

Advanced study at the university culminates in doctoral and master's degrees in a broad range of fields, as well as professional degrees in law and management. The doctoral degree requires the student to demonstrate a high level of scholarly competence, which includes the ability to conduct and report significant research in a highly effective way. Advanced systematic study in a discipline is also essential, and it is followed by comprehensive examinations that require students to integrate and understand the collective knowledge of their disciplines. A written dissertation resulting from independent research is scrutinized and tested in a concluding oral examination. The master's degree also includes advanced course work, demonstrated mastery on vital aspects of a discipline, skill in research methodology and theory, and preparation for future creative work. Nearly all master's programs involve integrating examinations and a major culminating piece of written work, usually a thesis, and an oral examination on that work. Advanced study at Brigham Young University takes place within a learning environment characterized by rigorous programs of study, by selective admission of highly qualified students, and by a graduate faculty who are committed to excellence in teaching, scholarship and creative activity, and service.

G r a d u a t e C o u n c i l

Consisting of senior faculty members from a variety of disciplines, the Graduate Council is one of a number of councils with major responsibility for academic programs and standards across the campus. The Graduate Council is primarily responsible for establishing and maintaining standards of quality in graduate education at Brigham Young University. In discharging this responsibility, the council sets policy, conducts extensive reviews of graduate programs, evaluates proposals for new programs, and makes recommendations to the provost on a variety of issues affecting graduate education.

The goal of the council is to ensure that excellent graduate programs are offered and sustained at BYU. Thus, the university is engaged in a continuing effort to consolidate resources behind strong programs and excellent graduate experiences.

Current 1993-94 members of the Graduate Council are: David Comer, Electrical Engineering; Marie Cornwall, Sociology; Kent Harrison, Physics; Tim Heaton, Sociology; Kate Kirkham, Organizational Behavior; Dilworth Parkinson, Asian and Near Eastern Languages; Harrison Powley, Music; Ray Reutzel, Elementary Education; Ward Rhees, Zoology; Morris Robins, Chemistry; Beverly Roeder, Animal Science; Gerald Williams, Law.

O f f i c e o f G r a d u a t e S t u d i e s

Although departments and colleges carry the major responsibility for graduate programs at BYU, certain procedures are done centrally. The admissions process begins in the Office of Graduate Studies, B-356 ASB, and progress toward a degree is recorded there. The office also maintains standards and requirements that apply uniformly across campus and serves as a clearinghouse for questions, problems, exceptions to policy, and requests for policy changes. The office is staffed by advisors thoroughly familiar with policies and procedures at the general university level. It is in the student's home department, however, that the most important advising is done in regard to individual program requirements and procedures. It is essential that a student consult frequently with departmental advisors. In many instances department requirements exceed university minimums.

U n i v e r s i t y L i b r a r y

University Librarian: Sterling J. Albrecht, 3080 HBLL, 378-2905

Deputy University Librarian: Randy J. Olsen, 3080 HBLL, 378-2908

Assistant University Librarian: Susan Fales, 3080 HBLL, 378-4995

Assistant University Librarian: K. Paul Jordan, 3080 HBLL, 378-6761

Assistant University Librarian: Larry J. Ostler, 3080 HBLL, 378-6724

Housing over three million volumes including an extensive collection of pamphlets, journals, current serials, newspapers, microform titles, and nonprint materials, the Harold B. Lee Library is a major resource for graduate student research. It is a depository for United States and Canadian government documents and regularly receives publications of state and local governments. Some of the library's strengths include special research collections in music in the areas of film, radio, viola, and harp. Notable collections have also been established in early modern European history, Renaissance Reformation history, American Church history, western Americana, Mormon Americana, nineteenth-century British literature, and the history of astronomy. Although many volumes of these collections are found in open stacks, most of the special collections are located on the fourth of the library's five levels. The Archives and Manuscripts Division is on the fifth level.

BYU participates in several cooperative programs that allow students and faculty to use materials housed in other state institutions and major research libraries throughout the United States:

1. **Interlibrary loan services** (Kathleen Hansen, 3437 HBLL, 378-6344) allow students to borrow books from other institutions. Photocopies of journal articles may be obtained for photocopying costs. A RUSH telefacsimile service is also available.
2. Through the **Utah College Library Council** arrangements have been made that allow students with valid BYU ID cards to borrow materials from other college and university libraries in the state.
3. The **Research Libraries Group** is a national consortium of thirty-six major research libraries that work together to improve access to library resources necessary in scholarly research. The benefits of membership in this group include priority treatment of interlibrary loan requests from many major U.S. libraries (e.g., Yale, Princeton, Stanford, University of Michigan) and the availability of some materials that normally do not circulate. This group also sponsors a computerized shared-cataloging system that provides access to the computerized portion of the card catalogs of member libraries. Inquiries are handled at the reference desk on the main floor (level 3, 378-2927).
4. The **Center for Research Libraries** is an organization whose objective is to increase the availability of research materials to its more than 180 member institutions. Through this organization, many infrequently used materials are deposited in a common pool from which all members may borrow. BYU students may borrow from the center's collection of archives, dissertations, government documents, journals, monographs, and newspapers. Inquiries are handled at the Interlibrary Loan Office.

5. BYU's Computer-assisted Research Services, through access to more than 200 computerized databases, provide bibliographic references on a given topic. There is a charge for computer connect time, but not for consultation services. Inquiries are handled in 3230 HBLL, 378-5627.

The library also provides a number of special services for graduate students. For example, some study carrels are available by assignment to graduate students (doctoral students have priority), and graduate students may check out circulating books for eight weeks rather than two (the undergraduate limit). Furthermore, research personnel in the library, in addition to reference desk staff, will work individually and in depth with graduate students on their research projects and theses.

The facilities of other libraries operated by The Church of Jesus Christ of Latter-day Saints are also available to Brigham Young University students. The Family History Library in Salt Lake City contains approximately 100,000 books and more than 800,000 rolls of microfilm. A regional family history library, operating under the general direction of the Church Family History Department, is located on the fourth level of the Harold B. Lee Library. The library of the Church Historical Department is also available by arrangement to advanced students for research. This facility is in the LDS Church Office Building in Salt Lake City.

U n i v e r s i t y G r a d u a t e S t u d i e s C a l e n d a r

Fall Semester 1994

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- January 15 Departmental application deadlines for fall 1994 entry to graduate study may be as early as January 15. For specific program and department deadlines and requirements refer to the department listing in the catalog or check with the department.
- February 28 Last day Office of Graduate Studies will process completed applications from international applicants for fall 1994 entry. Be aware that departments may require materials as early as January 15.
- April 1 Last day to submit ecclesiastical endorsement without a late fee
- May 15 Last day Office of Graduate Studies will process completed applications from U.S., Canadian, and permanent-resident applicants for fall 1994 entry. Be aware that departments may require materials as early as January 15.
- June 1 Financial aid priority processing date for Federal Stafford Loans
- July 15 Last day to apply for BYU short-term loans from the Financial Aid Office to pay fall semester 1994 tuition by the payment deadline
- August 15 Tuition payment deadline for fall semester 1994 to avoid \$50 late fee (must be in BYU Cashiers' Office by this date)
- 22-24 Annual University Conference
 - 24 Fall semester advance telephone registration ends at 5 p.m.
 - 26 Last day to pay tuition with \$50 late fee
 - 29 Classes begin. Late tuition fee increased to \$90
 - 29 In-person late registration for students who did not use the advance registration system
 - 30 Last day to drop classes without a fee per class
- September 5 Labor Day holiday
 - 12 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript
 - 12 Last day to pay tuition (with late fee)
 - 23 Last day graduate students may apply for December 1994 graduation (graduation fee must be paid)
- October 3 Last day to drop a class for academic reasons

- November 4 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for December 1994 graduation
- 15 Last day to apply for BYU short-term loans to pay winter semester 1995 tuition by deadline
- 15 Full payment due on BYU short-term loans for fall semester 1994
- 18 Last day graduate students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for December 1994 graduation
- 22 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- 24-25 Thanksgiving Day holiday
- December 2 Last day graduate students may submit final copies of a dissertation, thesis, or selected project to the library copy center for binding for December 1994 graduation
- 7 Last day of class instruction
- 8-10 Reading days
- 9 Last day graduate students may complete requirements for a degree, pay fees, and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for December 1994 graduation
- 12-16 Final examinations
- 16 December graduation (no commencement exercises)

Winter Semester 1995

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- January 15 Departmental application deadlines for winter 1995 entry to graduate study may be as early as January 15, 1994. For specific program and department deadlines and requirements refer to the department listing in the catalog or check with the department.
- June 30 Last day Office of Graduate Studies will process completed applications from international applicants for winter 1995 entry. Be aware that departments may require materials as early as January 15.
- September 15 Last day Office of Graduate Studies will process completed applications from U.S., Canadian, and permanent-resident applicants for winter 1995 entry. Be aware that departments may require materials as early as January 15.
- November 15 Last day to apply for BYU short-term loans from the Financial Aid Office to pay winter semester 1995 tuition by the payment deadline

- December 15 Tuition payment deadline for winter semester 1995 to avoid \$50 late fee (must be in BYU Cashiers' Office by this date)
- January 4 Winter semester advance telephone registration ends at 5 p.m.
- 6 Last day to pay tuition with \$50 late fee
 - 9 Classes begin. Late tuition fee increased to \$90
 - 9 In-person late registration for students who did not use the advance registration system
 - 10 Last day to drop classes without a fee per class
 - 16 Martin Luther King Day holiday
 - 20 Last day graduate students may apply for April 1995 graduation (graduation fee must be paid)
 - 23 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript
 - 23 Last day to pay tuition (with late fee)
- February 13 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- 20 Presidents' Day holiday
 - 21 Monday class instruction. No Tuesday classes
 - 24 Last day graduate students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for April 1995 graduation
- March 10 Last day graduate students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for April 1995 graduation
- 15 Full payment due on BYU short-term loans for winter semester 1995
 - 17 Last day graduate students may submit final copies of a dissertation, thesis, or selected project to the library copy center for binding for April 1995 graduation
 - 24 Last day graduate students may complete remaining requirements for a degree, pay fees, and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for April 1995 graduation
 - 30 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- April 18 Last day of class instruction
- 19–21 Reading days
 - 22, 24–27 Final examinations
 - 27 Graduation—university commencement
 - 28 Graduation—college convocations

Spring Term 1995

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- September 15 Departmental application deadlines for spring 1995 entry to graduate study may be as early as September 15.
- October 31 Last day Office of Graduate Studies will process completed applications from international applicants for spring 1995 entry. Be aware that departments may require materials as early as September 15.
- February 20 Last day Office of Graduate Studies will process completed applications from U.S., Canadian, and permanent-resident applicants for spring 1995 entry. Be aware that departments may require materials as early as September 15.
- March 15 Last day to apply for BYU short-term loans from the Financial Aid Office to pay spring term 1995 tuition by the payment deadline
- April 1 Last day to submit ecclesiastical endorsement without a late fee
 - 24 Tuition payment deadline for spring term 1995 to avoid \$25 late fee (must be in BYU Cashiers' Office by this date)
 - 28 Spring term advance telephone registration ends at 5 p.m.
- May 3 Classes begin
 - 3 In-person late registration for students who did not use the advance registration system
 - 4 Last day to drop classes without a fee per class
 - 10 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript
 - 10 Last day to pay tuition (with late fee)
 - 19 Last day to officially withdraw from the university without being graded
 - 19 Last day graduate students may apply for August 1995 graduation (graduation fee must be paid)
 - 29 Memorial Day holiday
- June 7 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
 - 16 Last day graduate students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for August 1995 graduation
 - 21 Last day of class instruction
 - 22 Reading day
- 23–24 Final examinations

Summer Term 1995

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- September 15 Departmental application deadlines for summer 1995 entry to graduate study may be as early as September 15. For specific program and department deadlines and requirements refer to the department listing in the catalog or check with the department.
- December 31 Last day Office of Graduate Studies will process completed applications from international applicants for summer 1995 entry. Be aware that departments may require materials as early as September 15.
- April 1 Last day to submit ecclesiastical endorsement without a late fee
- 15 Last day Office of Graduate Studies will process completed applications from U.S., Canadian, and permanent resident applicants for summer 1995 entry. Be aware that departments may require materials as early as September 15.
- May 12 Last day to apply for BYU short-term loans from the Financial Aid Office to pay summer term 1995 tuition by the payment deadline
- 19 Last day graduate students may apply for August 1995 graduation (graduation fee must be paid)
- June 14 Tuition payment deadline for summer term 1995 to avoid \$25 late fee (must be in BYU Cashiers' Office by this date)
- 16 Last day graduate students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for August 1995 graduation
- 21 Summer term advance registration ends at 5 p.m.
- 26 Classes begin
- 26 In-person late registration for students who did not use the advance registration system
- 27 Last day to drop classes without a fee per class
- 30 Last day graduate students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for August 1995 graduation
- July 3 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript
- 3 Last day to pay tuition (with late fee)
- 4 Independence Day holiday
- 7 Last day graduate students may submit final copies of a dissertation, thesis, or selected project to the library copy center for binding for August 1995 graduation
- 13 Last day to officially withdraw from the university without being graded

- 14 Last day graduate students may complete remaining requirements for a degree, pay fees, and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for August 1995 graduation
- 24 Pioneer Day holiday

August 1 Last day to officially withdraw from the university or drop classes for nonacademic emergencies

- 14 Last day of class instruction
- 15 Reading day
- 16-17 Final examinations
- 17 Graduation—university commencement
- 18 Graduation—college convocations

General Information

Tuition and Fees

Cashiers' Office
D-155 ASB, 378-7808

All students who register at BYU must pay full tuition and fees (in U.S. dollars) at the time of registration. Fees are to be paid at the Cashiers' Office, but questions regarding fee assessment should be addressed to Financial Services (D-148 ASB). The university reserves the right to change tuition and fees without notice.

Because students beyond the baccalaureate degree typically make a heavier demand on university resources than undergraduate students do, they are assessed at a higher tuition rate.

Full-Time and Part-Time Tuition Assessment

Students assessed full-time tuition pay a fixed rate of tuition; students assessed part-time tuition pay for the number of credit hours taken.

Full-time: 8.5 or more hours in a semester
4.5 or more hours in a term

Part-time: Fewer than 8.5 hours in a semester
Fewer than 4.5 hours in a term

Note: A fraction of an hour is counted as a full hour for assessing fees.

Audited Courses

The charge for auditing a course (attending class but not receiving a grade or credit) is the same as for taking the course for credit. Audited courses do not appear on the transcript.

Tuition

A significant portion of the cost of operating the university is paid from the tithes of The Church of Jesus Christ of Latter-day Saints. Therefore, students and families of students who are tithe-paying members of the Church have already made a contribution to the operation of the university. Because others have not so contributed, they are charged a higher rate of tuition. This practice is similar in principle to that of

state universities that generally charge nonresidents at a higher rate than residents.

Refunds

Students who officially discontinue from the university may receive a partial refund of tuition or fees. Details concerning discontinuance procedures and refund schedules are printed in the current class schedule.

1994-95 Tuition Schedule

Per Semester (Fall or winter)		Per Term (Spring or summer)	
LDS	Non-LDS	LDS	Non-LDS
Advanced-standing Students (other than students in the Law School and Marriott School of Management)			
Full-Time			
\$1,370	\$2,055	\$685	\$1,027
Part-Time			
\$152 per hour	\$228 per hour	\$152 per hour	\$228 per hour

Marriott School of Management and Law School Students

Full-Time			
\$2,200	\$3,300	\$1,100	\$1,650
Part-Time			
\$244 per hour	\$366 per hour	\$244 per hour	\$366 per hour

Fees

Late Tuition Payment Fee

Full-time and part-time students who pay tuition after the tuition payment deadlines (see current class schedule) for a semester or a term are assessed the following late fees:

Semesters:	
Before the semester begins	\$50
After the semester begins	\$90
Terms:	
Before or after the term begins.....	\$25

Students whose tuition check is not honored by the bank will be charged the late fee in effect at the time the check is redeemed.

Class Fees

Some courses require a fee in addition to tuition, to be paid upon registration. See course listings.

Miscellaneous General Fees

The university assesses fees for a variety of services. The following apply specifically to graduate education:

Application fee (nonrefundable)	
New applying student	\$30
Reapplying student	\$30
Graduation fee (nonrefundable)	
Master's degree.....	\$20
Doctoral degree.....	\$25
Graduate minimum registration fee (for graduate students using university facilities without formal registration for university classes)	
LDS.....	\$304
Non-LDS	\$456
Microfilming of dissertation (doctoral students only)	\$50*
Special examination fee	
Nonrefundable fee for each course challenged ..	\$20
Thesis binding (four copies)	\$40*

*Subject to change without notification.

Admissions

Graduate Admissions
B-356 ASB, 378-4091

Applications for admission to graduate study are available from the Office of Graduate Studies, B-356 ASB. The Law School (338 JRCB) and the Marriott School of Management (730 TNRB) use different forms, which they furnish on request.

A preliminary application, which includes all the international application deadlines for specific pro-

grams, can be obtained from the Office of Graduate Studies.

Deadlines for Graduate Applications

Application deadlines vary by department and program and are listed in the catalog under the department sections. All parts of the application (including test scores, letters of recommendations, transcripts, and any additional materials required by the department) must be received by the Office of Graduate Studies, B-356 ASB, no later than the deadline. Many programs recommend submitting complete applications at least 30 days before the deadline.

Application Requirements

Admission to graduate study is highly selective and is granted to a specific program for a specific semester or term. As a minimum, applicants who wish to be considered for admission must do the following:

U.S. Applicants

1. Submit a *complete* application *before* the application deadline. An application is not considered complete until the application fee has been paid and all official transcripts, letters of recommendation (Part C), the statement of intent, and the confidential report (Part B) are in, as well as Parts A and D of the admissions application.
2. Agree to maintain university standards of personal conduct.
3. Have received or be about to receive a baccalaureate degree from an accredited U.S. or Canadian university. The Office of Graduate Studies must receive an official transcript showing that the degree has been conferred. Without such verification, registration will not be permitted beyond the first semester.
4. Have earned at least a 3.0 GPA (on a 4.0 scale) in the last 60 semester hours of course work.
5. Submit evidence of proficiency in English if English is not the native language. A score of at least 550 on the TOEFL is required. Some departments may require a higher score.
6. Satisfy departmental requirements for consideration, including national examinations (such as the GRE) specified by the department.

Note: Students applying concurrently to more than one program must make separate application to each and pay a separate fee for each, but they need only submit one Honor Code Commitment and Confidential Report (Part B).

International Applicants (all non-U.S.)

In addition to the requirements for U.S. applicants, international applicants must do the following:

1. Submit a TOEFL score of at least 550 (some departments require a higher minimum score). This is required of all applicants for whom English is not the native language. Students with a bachelor's degree from a U.S. or Canadian university are usually exempt from this requirement.
2. Submit a completed Financial Certification form, with supporting documents. Applicants must provide proof of sufficient funds for the total length of their program of study.
3. Submit official transcripts from each institution attended, with accompanying certified English translation.
4. Submit an official copy of a diploma (preparation completed at least equivalent to a U.S. bachelor's degree), with accompanying official English translation.

Note: Brigham Young University will not process applications from applicants entering the United States with a B visa.

Full Disclosure Requirement

All information and documents required for admission must be submitted, including transcripts from every institution attended. Incomplete information or falsification of information constitutes grounds for immediate dismissal and loss of all credit earned at BYU. Once the university receives application materials, those materials become the property of the university and are kept in the strictest confidence as required by university policy. Once the parts of an application have been received, materials will not be returned to an applicant.

Admissions Process

The Office of Graduate Studies receives and checks all parts of the application for completeness. Information

for the department (Part D), the statement of intent, one copy of the official transcripts, letters of recommendation, and other departmental requirements are forwarded to the department; other parts of the application are retained in the Office of Graduate Studies. When the application is complete (an application from an international applicant must also include the TOEFL score and financial clearance to be complete), the Office of Graduate Studies clears the applicant for the department's consideration and asks for the department's recommendation.

Notice of Acceptance or Denial

After the admissions file has been reviewed for final acceptance by the department and the Office of Graduate Studies, the university notifies applicants of the admissions decision. Only a letter from the Office of Graduate Studies grants official university acceptance. International applicants receive an I-20 form or IAP-66 (Certificate of Eligibility) with their official acceptance letter; the I-20 and IAP-66 are used to obtain a student visa (F-1 or J-1).

Newly admitted international students are required to attend an orientation meeting at the beginning of fall semester. Details are available at the International Student Office (350 SWKT).

Non-degree-seeking Applicants

Students interested in registering at BYU on a non-degree-seeking basis are restricted to spring and summer term registration because of enrollment constraints during fall and winter semesters. Questions about non-degree-seeking applications should be referred to an admissions counselor in the University Admissions Office (A-183 ASB, 378-2500).

Registration

B-130 ASB, 378-2824

Eligibility

Upon receipt of an official letter of acceptance from the Office of Graduate Studies, new graduate students are eligible to register. Continuing graduate students are eligible if they have fulfilled the minimum registration requirement (6 hours per year) in the preceding academic year.

Registration Materials

The current class schedule, containing complete registration forms, instructions, and deadlines, is mailed to all new students with U.S. or Canadian mailing addresses. Continuing students may purchase one at the BYU Bookstore or the Registration Office. Class schedules are not mailed to addresses outside the U.S. or Canada, but international students may obtain a schedule and register when they arrive on campus.

Registration Process

The current class schedule contains a complete description of the registration process. What follows is a brief summary of that process:

Brigham Young University allows students to register by Touch-tone telephone or by using Academic Information Management (AIM) computer terminals (located in advisement centers and various campus locations). For fall and winter semesters, the process begins when the Registration Office mails a Registration Notice to all eligible students. The notice indicates the time the student can begin to register and any amounts due that must be paid before registration is possible. Beginning registration times are assigned on a priority basis with graduate students given the first priority. Registration for fall begins in April, for winter semester in October, and for spring and summer terms in January. With the Touch-tone system and AIM terminals, students can register and make registration changes until two working days before classes begin.

A Tuition Billing Statement with a listing of classes is mailed three weeks prior to the tuition deadline to each student registered for at least one class. Students who fail to pay tuition by August 15 for fall semester, December 15 for winter semester, and mid-April and mid-June for spring and summer terms will be assessed late tuition fees.

Once a student registers for classes, that student is officially enrolled and committed to attend. A student who then decides not to come must officially withdraw from all classes. Classes not dropped will remain on a student's record, and tuition will be charged until formal discontinuance is filed with the Discontinuance Office, B-150 ASB, 378-7705. Classes may be dropped using the discontinuance

action code on the Touch-tone telephone registration system or AIM terminal.

Changes in Registration

Students may add or drop classes twenty-four hours a day by Touch-tone telephone or AIM terminal until two working days before classes begin. After the semester or term has started, however, each academic department determines how classes are added in that department. Final dates, fees, and instructions for adding and dropping classes are printed in the current class schedule.

Auditing Classes

U.S. students who wish to audit classes (attend but not receive credit) may add such classes on a space-available basis with instructor approval during the first ten class days of a semester (six days of a term). International students may not audit classes.

Audited classes do not appear on the transcript, will not be considered in calculating enrollment verifications, will not fulfill the minimum registration requirement, and do not apply toward a graduate degree. In addition, audited courses may not be paid for by graduate scholarship funds.

Registration Requirements

First Semester

Because acceptance is granted for a specific semester, students are required to register for at least 2 hours in the semester for which acceptance has been granted, or the acceptance is forfeit. New students who do not enroll the semester or term for which they are accepted and who wish to enroll in a subsequent semester must inform the Office of Graduate Studies immediately. Acceptance in one semester or term does not guarantee acceptance in a subsequent semester or term.

Minimum Registration Requirement

U.S. Students, Semester or Term. U.S. graduate students are required to register for at least 2 credit hours during any semester or term in which they use any university facilities, consult with faculty, or take comprehensive or oral examinations. The number of graduate credit hours for which they register must, in the judgment of the faculty advisor, accu-

rately reflect the student's involvement in graduate study and use of university resources such as libraries, laboratories, and computer facilities. In no case will the registration be for fewer than 2 credit hours per semester.

U.S. Students, Academic Year. To retain active status and to qualify for subsequent registration, graduate students *must register for at least 6 semester hours each school year* and receive acceptable grades (no D, E, UW, NS, or I grades are allowed, nor are audits or correspondence courses). Students who do not fulfill this yearly requirement are dropped from their graduate programs; they lose their graduate status and must apply for readmission if they wish to continue.

International Students. International students must register for at least 9 semester hours each fall and each winter semester to fulfill U.S. Immigration and Naturalization Service requirements. Questions should be directed to the International Student Office (350 SWKT, 378-2695).

Readmission

Former graduate students who were dropped for failure to meet the minimum registration requirement, and who wish to resume their graduate studies, must submit an Application to Resume Graduate Study (available from the Office of Graduate Studies), pay a \$30 nonrefundable processing fee, and submit a Reapplication Honor Code Commitment Form. International students will also need to submit a new Financial Certification Form. Students should expect their previous course work to be reevaluated and their degree requirements to reflect current expectations of the program.

Loss of Eligibility to Register

Once enrolled, a graduate student becomes ineligible to register for subsequent semesters if:

1. The student has not fulfilled the minimum registration requirement (6 hours per year), has withdrawn from the graduate program, or has had his or her graduate degree program terminated by the department.
2. The student has not submitted a study list by the third week of the second semester after admission.
3. The Office of Graduate Studies has not received official transcripts showing that the required prerequisite degrees have been conferred.
4. The student has violated the BYU Honor Code and is not cleared by the Honor Code Office.
5. The student has failed to submit an annual continuing ecclesiastical endorsement.

Financial Aid Registration Requirements

It is the student's responsibility to comply with any registration requirements established by sponsoring agents for student loans, loan payment deferrals, assistantships, internships, scholarships, and awards.

Graduate Assistants, Interns, and Award Recipients

Graduate Assistants, Interns, and Award Recipients. Graduate students receiving assistantships, awards, or internships through BYU must register for at least 2 hours per semester or for 1 hour per term. Departmental requirements may exceed these minimums, and international students must register for at least 9 semester hours each fall and winter semester.

BYU Short-Term Loans. Only degree-seeking students enrolled in day school are eligible for short-term BYU tuition loans. Since the amount borrowed is directly applied toward the cost of tuition, no minimum level of enrollment is required.

Federal Loans (Stafford Loans and Supplemental Student Loans). To qualify for federal loans, graduate students must normally register for at least 4.5 hours each semester or 2.5 hours each term. However, the regulations require that students who have used their six-month "grace" period but wish to defer payment on a previous federal loan must be registered full-time—8.5 or more hours per semester and 4.5 or more hours per term. Independent study, audit, or workshop classes cannot be used to meet the minimum hour requirement.

Verification of Enrollment Status

A student who is enrolled for 8.5 or more credit hours a semester or 4.5 credit hours or more for a term is considered full-time for tuition purposes. International students and students receiving financial assistance may be required to register for more hours to be considered a full-time student. A student enrolled for 4.5 to 8 credit hours a semester or 2.5 to 4 credit hours a term is considered a half-time

student. Graduate students may request verification of their enrollment status from the Records Office, B-150, ASB.

Master's and doctoral students can petition for graduate full-time status (i.e., be considered a full-time student even if they are enrolled for fewer than 8.5 credit hours). To be considered for an exception the student must: (1) be enrolled in at least 2 credit hours each semester and 1 credit hour each term and (2) be certified by his or her department as being engaged full-time (40 or more hours per week) in pursuit of his or her degree. Requests for such an exception should be directed to the Office of Graduate Studies, B-356, ASB.

Withdrawal or Discontinuance

Students who wish to withdraw from the university must initiate that process at the Discontinuance Office, B-150 ASB, 378-7705.

Advisement

Academic Sponsor

Once accepted into a graduate program, students are assigned a department sponsor, often the department graduate coordinator, who guides their first registration and individual study until an advisory committee is appointed in the *first semester*.

Advisory Committee

During the first semester, students should arrange for the appointment of an advisory committee of graduate faculty. Master's (thesis and nonthesis) committees consist of a chair from the major department and at least one other member; doctoral committees have a chair from the major department and at least two other members. Departments may require additional members. If a student declares a minor, one member must be from the minor department.

Although the chair bears the main responsibility for advising and directing the student, other committee members also assist and advise the student concerning course work, degree requirements, and work on the thesis. It is also important that plans for the thesis, creative project, or dissertation be initiated as early as possible.

Study List

A study list is a carefully considered program that helps students fulfill all degree requirements. It is essential for organized, well-ordered graduate work. The study list should be completed under the direction of the advisory committee during the student's first semester, and in no case later than the third week of the second semester. Students without study lists recorded with the Office of Graduate Studies cannot register for subsequent semesters.

Necessary changes in a student's study list or committee can be made if authorized by the advisory committee and department graduate coordinator.

Progress Reports

Three times a year (during the first month of fall and winter semesters and spring term) each graduate student is sent a computer-generated progress report that compares the individual study list with the courses taken and summarizes the student's progress in a program: classes completed, current registration, classes still needed, and grade point average. In addition, the progress report alerts a student to possible problems with academic status, GPA, prerequisite degrees needed, minimum registration requirements, time limits, and courses.

Degree Requirements

The following minimum standards for graduate programs have been established by the university, though it is not uncommon for departments to have higher standards. Additional information about specific requirements for each graduate program appears under individual department listings in this catalog. Furthermore, most departments publish detailed information about their program requirements that is available from department offices on request. Students should consult frequently with department graduate coordinators and advisory chairs.

Doctor of Philosophy Degree

Admission Requirements

An applicant seeking admission to a program leading to the doctor of philosophy degree must meet the requirements outlined in the Admissions and

departmental sections of this catalog. Prospective students should consult with individual departments for specific requirements.

Course Work Requirements

Advisory committees or program advisors, appointed following admission to a graduate program, will help students prepare their courses of study. The following credit requirements must be met:

1. *Credit Hours.* The minimum required for students with no master's degree is 54 semester hours beyond the baccalaureate degree; but the 54 hours may not include undergraduate (100 to 400 level) or other courses needed to fulfill prerequisite and skill requirements, or more than 18 hours of dissertation credit. Students who have earned a master's degree must complete at least 36 semester hours of additional graduate work at BYU beyond the master's degree. So long as these restrictions are met, students may, with the approval of their advisory committee, apply up to 36 hours of a master's program toward a doctoral degree. See the Credit Policies section of this catalog for information about credits that may not apply toward a graduate degree.
2. *Minor.* If a minor is required as part of a doctoral degree, a student must:
 - a. Obtain the approval of the department chair of the major and the minor departments.
 - b. Select a graduate faculty member from the minor department (approved by the department chair of the minor department) to serve as an advisory committee member.
 - c. Register for and complete 12 semester hours of approved graduate credit in the minor.
 - d. Pass an oral or a written comprehensive examination in the minor field (prepared by the minor committee member).
3. *Dissertation Credit.* A student seeking a doctor of philosophy degree must register for and complete a minimum of 18 hours of dissertation credit. No more than 18 hours may count toward the 54 hours required, and all 18 hours may not be taken in one term or semester. Registration for dissertation credit and work on the dissertation must be concurrent.

Time Limit

A doctoral degree must be completed within eight years of the first semester of enrollment. See the Credit Policies section of this catalog for more detailed information about outdated credits and the time limit.

Residency

Doctor of philosophy students must register for at least two consecutive 6-hour semesters on the BYU campus.

Comprehensive Examination

Students must pass a written comprehensive examination in their doctoral field under the direction of the major department. The minor department tests in the minor field. This examination is normally given when the student has completed the required course work for the doctoral degree.

Departments may also require an oral portion of the comprehensive examination. A student is advanced to degree candidacy only after successful completion of the comprehensive examination.

Oral Defense of Dissertation

The final oral examination (defense of the dissertation) must be scheduled with the Office of Graduate Studies *at least two weeks* in advance. Final examinations may not be held during the interim periods between semesters. All members of the BYU academic community are invited to attend the final oral examination, but only appointed members of the examining committee may question the candidate and vote on the candidate's performance.

A copy of the candidate's dissertation must be placed in the Reserve Library (3114 HBLL) at least two weeks in advance of the oral examination so that interested faculty and students may review it before the examination.

Examination Committee

A doctoral examination committee must consist of no fewer than five voting graduate faculty members, *at least two of whom are nonadvisory*. The chair and at least one other member of the examination committee must be nonadvisory. Faculty who have served on a candidate's advisory committee earlier in the program, but who have since been replaced,

will be considered "nonadvisory" for purposes of the examination if so approved by the department.

Decision of the Examination Committee

The committee may vote to "pass," to "pass with qualification," to "recess," or to "fail" the student.

If the decision is to pass with qualification, the committee may require minor revisions of the dissertation, strengthening of the candidate's preparation in subject matter areas, or both. When these qualifications are cleared and the orals committee chair has properly recorded the clearance with the Office of Graduate Studies, the student is judged to have passed the examination.

If two or more examiners vote to recess, the examination is recessed. This permits the candidate to reschedule (with the department and the Office of Graduate Studies) a second and final examination. The new examination cannot be held sooner than a month after the recessed examination. In addition, the second examination must be convened with the original examination committee.

If two or more examiners vote to fail, the examination is failed and the graduate degree program of the student is terminated.

Doctor of Education Degree

Requirements for the doctor of education degree are in many ways the same as for the doctor of philosophy degree described in the preceding section. Differences in the two programs are as follows:

Differences in Admission Requirements

In addition to the requirements included in the Admissions section of this catalog, an applicant seeking admission to a doctor of education program must either be certified as a teacher or have completed 22 semester hours of approved courses. Further, an applicant must have completed two years of successful professional experience. Prospective students should consult with individual departments for specific requirements.

Differences in Course Work Requirements

1. *Credit Hours.* Most EdD degrees require more hours than the minimums described.
2. *Dissertation Credit.* A student seeking a doctor of education degree must register for and complete

a minimum of 12 hours of dissertation credit. No more than 12 hours may count toward the 54 hours required, and the 12 hours may not all be taken in one term or semester. Registration for dissertation credit and work on the dissertation must be concurrent.

Difference in Residency

Doctor of education students must also register for at least two consecutive 6-hour semesters on the BYU campus. However, in selected programs students may fulfill the residency requirements by registering for three consecutive full-time summer terms.

Master's Degree

Admission Requirements

An applicant seeking admission to a master's degree program must meet the requirements outlined in the Admissions section and the department section of this catalog. Prospective students should consult with individual departments for specific requirements.

Course Work Requirements

Advisory committees or program advisors, appointed following admission to a graduate program, will help students prepare their courses of study. The following credit requirements must be met:

1. *Credit Hours.* A student seeking the master's degree must complete a total of at least 30 semester hours of credit (excluding prerequisite courses). See the Credit Policies section of this catalog for information about credits that may not apply toward a graduate degree.
2. *Minor.* If a minor is required as part of a master's degree, a student must:
 - a. Obtain the approval of the department chair of the major and the minor departments.
 - b. Select a graduate faculty member (approved by the department chair of the minor department) to serve as an advisory committee member.
 - c. Register for and complete 9 semester hours of approved graduate credit in the minor.

- d. Pass an oral or a written comprehensive examination in the minor field (prepared by the minor committee member).
- 3. *Thesis Credit or Project Credit.* Students in thesis programs must register for and complete a minimum of 6 hours of thesis credit. No more than 6 hours of thesis credit may count as part of the 30-hour minimum. Registration for thesis credit (from 1 to 6 hours per semester approved by the advisory chair) and work on the thesis must be concurrent. For students in a project program, at least 2 project credit hours are required.

Time Limit

All master's degrees must be completed within five years of the first semester of enrollment. See the Credit Policies section of this catalog for more detailed information about outdated credits and the time limit.

Full-Time Registration Requirement

In a few approved integrated master's programs (engineering and accounting), students may earn their baccalaureate and graduate degrees concurrently. Students in such integrated programs must pay graduate tuition for two full-time semesters.

Oral Defense of Thesis or Selected Projects

The final oral examination (defense of thesis or project) must be scheduled with the Office of Graduate Studies *at least* two weeks in advance. Final examinations may not be held during the interim periods between semesters. All members of the BYU academic community are invited to attend the final oral examination, but only appointed members of the examining committee may question the candidate and vote on the candidate's performance.

A copy of the candidate's thesis or project must be placed in the Reserve Library (3114 HBLL) at least two weeks in advance of the oral examination so that interested faculty and students may review it before the examination.

Examination Committee

A master's examination committee must consist of no fewer than three voting graduate faculty members, *at least two of whom are nonadvisory*. The chair and at least one other member of the examination

committee must be nonadvisory. Faculty who have served on a candidate's advisory committee earlier in the program, but who have since been replaced, will be considered "nonadvisory" for purposes of the examination if so approved by the department.

Decision of the Examination Committee

The committee may vote to "pass," to "pass with qualification," to "recess," or to "fail" the student.

If the decision is to pass with qualification, the committee may require minor revisions of the thesis or project, strengthening of the candidate's preparation in subject matter areas, or both. When these qualifications are cleared and the orals committee chair has properly recorded the clearance with the Office of Graduate Studies, the student is judged to have passed the examination.

If *two or more* examiners vote to recess, the examination is recessed. This permits the candidate to reschedule (with the department and the Office of Graduate Studies) a second and final examination. The new examination cannot be held sooner than a month after the recessed examination. In addition, the second examination must be convened with the original examination committee.

If *two or more* examiners vote to fail, the examination is failed and the graduate degree program of the student is terminated.

Credit Policies

Appropriate Credit Enrollment

Because graduate study is more rigorous than undergraduate study, a student should not register for more than 12 hours in a semester or 6 hours in a term. In many programs, even that may be too much. Furthermore, registration for thesis and dissertation credit and work on the thesis and dissertation should be concurrent and reasonable. It would be inappropriate, for example, for a student to register for all 18 dissertation credit hours in one semester or term. Students should consult with their advisors in determining an appropriate and reasonable credit enrollment.

Restrictions on Credits That May Apply Toward a Graduate Degree

Nondegree, Senior, and Transfer Credit

Nondegree, senior and transfer credit, singly or combined, cannot exceed 10 semester hours of a graduate degree program.

Nondegree Credit. Credit taken after the baccalaureate degree has been received, but before the semester of formal admission to a graduate program, is defined as nondegree credit. Only with department approval can any such credit be considered as part of a graduate degree program.

Senior Credit. In some restricted instances students seeking a master's degree may apply credit taken during the senior year at BYU toward that degree, but in no instances can this credit apply to both a baccalaureate and a graduate degree.

Transfer Credit. Credit taken at other accredited universities in the United States or in Canada may, with department approval, count toward a graduate degree at BYU if the following conditions are met:

1. Any course to be transferred must be clearly graduate level.
2. The grade for any such course must be B or better (pass/fail courses are not transferable).
3. Home study, correspondence, and extension courses are not transferable.
4. Transfer credit in combination with nondegree and senior credit cannot total more than 10 hours.
5. Credit cannot have applied to another degree.

Credit from foreign universities can be considered for transfer only if certified by special examination (see the Credits Certified by Special Examination section that follows for details).

Other BYU Credit

Lower-division courses (100 and 200 level), Independent Study (correspondence) courses, 300- and 400-level religion courses, and education courses numbered 514R *cannot* apply toward a graduate degree.

No undergraduate courses may apply toward a doctoral degree (except those already applied to a master's degree).

Credits Certified by Special Examination

In rare circumstances, and with the approval of the department and the graduate dean, up to 10 credits may be certified by special examination. For example,

- a. A student may wish to transfer normally disallowed graduate credit from a nonaccredited institution or from a foreign university.
- b. A student may wish to challenge a course on the study list that covers material already mastered.

Applications to take special examinations may be obtained from the Office of Graduate Studies. For information about special examination fees, see the Tuition and Fees section of this catalog.

Outdated Credit and Time Limits

Only credit taken within the time limit for each degree may count toward the degree (eight years for doctoral degrees and five years for master's degrees). Petitions to extend time limits and count outdated credit are governed by the following:

1. Departments and colleges may petition for up to a one-year extension by providing reasonable evidence that extenuating circumstances caused an unavoidable delay in the student's progress toward a degree.
2. Departments and colleges may petition to allow credit outdated by more than one year but no more than five years to apply toward a degree, but the petition must be accompanied by impressive documentation that the credit in question has been updated by courses retaken, by special readings courses in the subjects outdated, or by examinations in each of the courses.
3. No credit outdated by more than five years may apply to a current degree, regardless of circumstances.

Academic Standards

Grade Point Average (GPA) Requirements

Graduate students whose graduate program (study list) GPA falls below 3.0 (prerequisite and skill courses are exempted) will not be allowed to graduate and may be dismissed from their graduate programs. Students whose grades frequently fall in the C range or below should consult with their commit-

tees about the advisability of continuing graduate study. No D credit may apply toward a graduate degree.

Annual Reviews of Graduate Students

Departments are asked to evaluate the performance of graduate students *at least once a year*; some evaluate more frequently. Students granted provisional admission should expect a review as early as the end of the first semester.

Each department establishes its own evaluation criteria and the standards it requires of graduate students, but generally students can expect to be evaluated on their total academic performance, their fulfillment of program requirements (study list submitted, courses completed on schedule, prospectus approved by department, student advanced to candidacy), and their professional performance (including quality of teaching and research). Copies of departmental evaluation criteria are available from individual departments.

Departments rate student performance as satisfactory, marginal, or unsatisfactory, indicating the reasons for a low rating, and inviting the student to respond to the evaluation or to comply with a set of stated conditions for remaining in the program.

Termination of Graduate Status

Termination of graduate status may result if a student:

1. Fails to fulfill the university's minimum registration requirement.
2. Makes a request to withdraw (with the intent to pursue a degree at another university, for personal reasons, or in response to department recommendation).
3. Receives a marginal or unsatisfactory rating in a periodic review by the academic department and is unable or unwilling to comply with conditions for continuance outlined by the department.
4. Fails to make what the department or the university deems to be satisfactory progress toward a graduate degree.
5. Fails the departmental comprehensive examination.
6. Fails the final oral examination (defense of dissertation, thesis, or project).
7. Violates the university's standards of conduct or Honor Code.

Appeal of Termination

A student dismissed or facing dismissal may respond to or appeal that termination or impending termination. Such responses or appeals should be directed, in writing, to the department chair. A student who wishes further consideration may appeal to the college dean. Ultimately, a final appeal may be made to the university graduate dean who, if circumstances warrant it, may appoint a committee of impartial faculty members to adjudicate the matter.

Student Academic Grievances

The university has an established procedure for handling student academic grievances. If consulting with the teacher or the graduate advisory chair does not resolve a grievance, a graduate student should describe the problem to the department graduate coordinator and/or the department chair. If difficulties persist, the student may ask the college dean and finally the graduate dean for assistance.

Records

Office of Graduate Studies

B-356 ASB, 378-4091

The Office of Graduate Studies maintains student records pertinent to graduate study at BYU, including original applications, approved study lists, and official transcripts received from other universities.

Records Office

B-150 ASB, 378-2631

The Records Office maintains permanent records of all academic work done at the university. The office is also responsible for issuing official transcripts of credit, which include only courses completed through BYU.

Repeating Classes

Some graduate programs do not allow students to repeat required graduate courses. Those that do are governed by the following policies:

1. Brigham Young University courses may be repeated unless such courses carry an R suffix (see discussion of R suffix below).

- 2 Courses taken at another university may be repeated at Brigham Young University, but the appropriate BYU department chair must supply a statement of equivalency.
3. Courses taken at another institution may be repeated there and the credit transferred to Brigham Young University. Students wishing to transfer credit to BYU should consult the Credit Policies section of this catalog because not all transfer courses may count toward a graduate degree.

Note: A course repeated at an institution other than the one at which it was taken originally, and other than at BYU, will not be counted as a repeated course.

When a class is repeated, only the last grade earned counts; the grade point average is computed using the grade and credit hours earned the last time the repeated class was taken.

"R" courses are treated differently: Since an R course is one that may be repeated for credit, it is assumed that the subject matter varies from semester to semester in such a course. Therefore, when an R course is repeated, both grades count; the grade point average is computed using the grades and credit of both classes.

Transcript Record Holds

A hold is placed on the record of a student who fails to meet university obligations (fees outstanding, university standards violations, traffic tickets, library fines, etc.). No copy of the transcript or information pertaining to it will be released until the obligation is fulfilled.

Confidentiality of Records Policy

The policy of Brigham Young University concerning confidentiality of student academic records reflects a reasonable balance between the obligation of the university for the instruction and welfare of the student and the university's responsibility to society. The university makes every effort to maintain student academic records in confidence by withholding information from individuals who are not authorized to receive it. Faculty and administrative officers who have a legitimate need to use students' records will be allowed access to such records as needed without prior permission from the student.

The Confidentiality of Records Policy is detailed in the University Handbook and the BYU Undergraduate Catalog.

Financial Assistance

Graduate Awards

BYU offers four types of graduate awards, all through individual departments—assistantships, internships, private scholarships, and supplementary awards. Because teaching and research are vital components of graduate programs, most graduate awards given by Brigham Young University are in the form of teaching and research assistantships and internships. Supplementary awards are tuition scholarships and can only be used to pay the cost of tuition. Audit credit, credit earned by special examination, or Independent Study may not be paid for by a supplementary tuition award.

Application

New students may apply for graduate awards as part of the regular admission process. Continuing students can obtain information and applications from their departments.

Requirements and Selection

To be eligible for assistantships, internships, or supplementary awards, students must be degree-seeking graduate students in good standing who are registered for at least 2 credit hours in the semester (or 1 credit hour in the term) for which the award is granted. The awards are competitive and generally go to students whose academic performance indicates real merit. All selections are made by academic departments.

Student Loans

Norman B. Finlinson, Director of Student Financial Aid
A-41 ASB, 378-4104

Two types of student loans are available to graduate students who qualify—BYU need-based loans (short-term, Law School, and Marriott School of Management) and federal Stafford Loans. Only degree-seeking students who are making satisfactory academic progress will be considered for loan approval.

Application

Application materials and information about eligibility and repayment requirements are available in the Financial Aid Office.

Deadlines

Students must submit all application materials for any BYU need-based loans and federal loans by June 1, 1994.

Student Employment

C-40 ASB, 378-3561

Most student campus jobs other than assistantships and internships are listed at Student Employment Services. Students who are ready to seek employment should bring proof of acceptance as a full-time student to this office.

Certain governmental restrictions apply to students from foreign countries. Some students are not eligible to obtain work permits until they have been in school for one semester. The International Student Office is able to determine international student status regarding employment.

Federal immigration regulations require everyone hired in the U.S. to prove eligibility to work in America. U.S. citizens do so by presenting a social security card, state-certified birth certificate, or U.S. passport with a current BYU identification card. Non-U.S. citizens need to present a current passport with attached I-94 or I-20 ID.

Graduation Policies and Instructions

All Graduate Students

Final Semester Registration

Before applying for graduation, a graduate student should have completed all course work on his or her approved study list or be currently registered for the remaining requirements. During the final semester, or the semester of final oral and written examinations, a graduate student must either register or pay an equivalent registration fee to the Office of Graduate Studies for at least 2 semester hours of credit. Audit and independent study credits do not count.

Application for Graduation

Graduate students should apply for graduation by the deadlines listed in the University Graduate Studies Calendar on pages 13–18. Applications received after the deadlines will be processed for the next graduation. To apply for graduation, all students—in thesis or nonthesis programs—must submit a Graduation Application through their departments and pay the graduation fee to the Cashiers' Office.

After the department has completed its preliminary check and given its approval, the application is sent to the Office of Graduate Studies for a final check. Students will be notified of the results of this evaluation and informed of any problems that need attention.

Graduation Fees

Doctoral candidates	\$25
Master's candidates	\$20
TESL certificate applicants	\$20
Psychological specialists	\$20

1994–95 Graduation Deadlines

See the University Graduate Studies Calendar on Pages 13–18 for graduation deadlines.

General Caution: The graduation deadlines are firm. Students submitting materials after the deadlines will be candidates for the *next* graduation.

Students in Dissertation, Thesis, and Selected Project Programs

Students in selected project programs must meet the same requirements as students in dissertation and thesis programs with regard to the scheduling of the final oral defense, the composition of the examination committee, and the standards and format of the major written work. The following departments offer selected project programs: Agronomy and Horticulture, Dance, Instructional Science, Nursing, Technology Education and Construction Management, Theatre and Film, and Zoology.

Format Requirements

Colleges and departments, not the Office of Graduate Studies, are responsible for both the content and the format of dissertations, theses, and selected pro-

jects. These works are expected to meet the highest standards of excellence in substance and in appearance. The Graduate Council, in its review of graduate programs, and the graduate dean select dissertations, theses, and projects for reading and review.

Requirements regarding the number of copies to be submitted and the format of such items as the title page, the acceptance page, and the abstract page are stated in "Guidelines for Meeting Minimum Standards," available from either the department or the Office of Graduate Studies.

Scheduling the Oral Defense

All students in dissertation, thesis, or selected project programs must schedule the final oral examination *at least two weeks* in advance. Final examinations may not be held during the interim periods between semesters.

Copy of Work Placed in Library

All members of the BYU academic community are invited to attend the final defenses of dissertations and theses. Therefore, all students in dissertation, thesis, or selected project programs are required to place a copy of their work in the Reserve Library (3114 HBLL) at the time the final oral examination is scheduled (two weeks in advance of the oral final) to enable interested faculty and students to review it before the examination.

Final Copies

Ample time should be allowed for making corrections to the work after the final oral defense and before the deadline for submitting final copies to the library (December 2, 1994, for December 1994; March

17, 1995, for April 1995; and July 7, 1995, for August 1995).

Commencement and Convocation

All candidates for graduation are encouraged to participate in the university's commencement and convocation exercises in either April or August (students completing degrees in December are invited to participate in the following April commencement activities). Doctoral candidates are hooded in the commencement exercises; master's candidates are recognized in their respective college convocation exercises.

Honor Designations

No honor designations are given upon conferral of advanced degrees. Various honor societies, however, may nominate graduate students for membership.

Diplomas and Transcripts

Diplomas are mailed to graduates from six to eight weeks after graduation. Receipt of the degree is recorded on the student's official transcript within one month after graduation, and a complimentary copy of the transcript is mailed with the diploma.

Letter of Completion

After a graduate student has completed all the requirements for graduation, the Office of Graduate Studies can furnish a letter of completion if the student requests it. This document certifies that the student has satisfied all the requirements for the degree and confirms that the degree will be conferred.

College of Biology and Agriculture

Dean: Clayton S. Huber, Professor, Food Science and Nutrition, 301 WIDB

Associate Dean, Graduate Studies: Richard W. Heringer Professor, Zoology, 302-B WIDB

Associate Dean: William L. Park, Professor, Economics, 302-C WIDB

The departments in the College of Biology and Agriculture offer the following graduate degrees:

Agronomy and Horticulture

MS Agronomy

MS Horticulture

Animal Science

MS Animal Science

Botany and Range Science

MS Biological Science Education

MS, PhD Botany

MS Range Science

MS, PhD Wildlife and Range Resources

Food Science and Nutrition

MS Food Science

MS Nutrition

Microbiology

MS, PhD Microbiology

Zoology

MS Biological Science Education

MS, PhD Zoology

The College of Biology and Agriculture also offers the following:

Molecular Biology: Students can pursue an MS degree in molecular biology through one of the departments in the college (Agronomy and Horticulture, Animal Science, Botany and Range Science, Food Science and Nutrition, Microbiology, and Zoology). Students can pursue a PhD degree in molecular biology through one of the following three departments in the college (Botany and Range Science, Microbiology, and Zoology). See listing under Molecular Biology as well as each department for requirements.

Research Facilities

The College of Biology and Agriculture is actively engaged in research and has several special facilities and programs of particular interest to graduate students.

BYU Agriculture Station

Director: Max V. Wallentine, 392 WIDB

The station encompasses several sites, all of which support research in basic and applied agriculture. Station facilities include an 837-acre farm with 80 acres of orchards, crop research plots, a 440-cow dairy, a 60-head beef herd, and a 70-sow swine unit in Spanish Fork, Utah, a few miles south of Provo; the 9,388-acre BYU Skaggs Research Ranch near Malta, Idaho; and several livestock project areas in north Provo, among them the Ellsworth Meat and Livestock Center and poultry, sheep,

and horse projects. At these facilities, research can be conducted on physiology and reproduction, health, and nutrition of several species, including beef and dairy cattle, sheep, horses, swine, goats, rabbits, guinea pigs, chickens, and turkeys.

Ezra Taft Benson Agriculture and Food Institute

Director: James B. Jensen, 110 B-49

The major objective of the institute is to raise the quality of life among the people of the world through improved nutrition and enlightened agricultural practices. Emphasis is placed on teaching and training students who wish to work in foreign countries and on training people from those countries in agriculture and food science practices that can be used to make a difference in improving life. Research to improve agricultural practices, family nutrition, and appropriate technology is encouraged.

M. L. Bean Life Science Museum

Director: Stanley L. Welsh, 290 MLBM

Exhibits and collections of biological specimens are housed in the M. L. Bean Life Science Museum. The exhibits include habitat studies of local as well as exotic plant and animal species and a large and valuable collection of trophies from North America, Africa, and Asia.

Tours and Educational Programs. The museum offers a broad range of educational opportunities for students, from specialized graduate research in the various systematic collections housed in the museum to impromptu tours for the casual visitor. Many university classes make arrangements to utilize the extensive holdings. The museum also serves the community by providing educational opportunities for elementary and secondary schools as well as civic groups.

The Botanical Collection includes herbaria of vascular plants, mosses, liverworts, lichens, algae, and fungi from many parts of the world. The vascular plant collection includes more than 10,000 species represented by more than 325,000 herbarium sheets. The collection is made up principally of plants from western North America but includes many materials from the eastern United States, Europe, Mexico, and Australia. Acquisitions of plants from Alaska, Greenland, Siberia, and the Canadian Arctic have added significantly to the collections of Arctic plants. Lichens and mosses number about 8,000.

The herbarium includes more than 2,000 specimens from the Mediterranean region of Europe and from the Middle Eastern countries of Iran and Afghanistan. The fossil plant collections contain more than 10,000 specimens.

The Zoological Collections consist of a large series of vertebrate and invertebrate species from North America and from many foreign countries. These materials are available for study by teachers, advanced students, and visiting scientists.

The invertebrate collections include insects and their near relatives as well as other phyla of invertebrates obtained locally and from more distant places. The collections also represent medically important arthropods such as fleas, lice, mites, and ticks. Collections of special interest include marine shells and more than one million insects (with particular emphasis on butterflies, flies, and beetles.) Collections also represent other invertebrate groups.

The vertebrate collections consist of thousands of fish, amphibian, reptile, bird, and mammal research specimens. In addition to the representative series of local species, the vertebrate collections include South and Central American birds, birds' eggs, and Hawaiian fishes. Staff members, graduate students, and friends of the university have contributed material from Mexico, South America, Africa, Taiwan, Malaya, the South Pacific islands, and other areas throughout the world. The vertebrate collections also include big game trophy collections from Africa, India, and North America.

Electron Optics Laboratory

Director: Wilford M. Hess, A-140 CLFB

In the electron optics laboratory, researchers can accomplish all standard electron optics procedures. The laboratory has transmission and scanning electron microscopes equipped with X-ray microanalysis capabilities, plus accessory equipment for freeze-fracture, freeze-drying, and necessary support facilities, including confocal laser scan microscopy.

USDA Forest Service Shrub Science Laboratory

Project Leader: Durrant MacArthur

Housed on the BYU campus, this laboratory supports one of the finest research programs on native shrubs in the world. Here eleven PhD research scientists with adjunct faculty appointments work with BYU faculty members and graduate students. Laboratories, greenhouses, and gardens on campus and around the state support studies on desert shrubs.

Dairy Products Laboratory

Researchers in the Dairy Products Laboratory conduct research on milk and dairy products, using full- and pilot-scale equipment.

Sensory Laboratory

The sensory laboratory is a modern taste panel facility that features isolation booths, positive pressure in the booth area, and controlled lighting. Preference and difference testing is conducted using consumers and trained panelists. The sensory laboratory also has facilities for descriptive analysis.

Western Dairy Foods Research Center

Under a five-year agreement, Brigham Young University is affiliated with Utah State University and Oregon State University in the Western Dairy Foods Research Center. As one of six such centers nationwide, this center is dedicated to cheese and cultured product research.

Lytle Ranch Preserve

Graduate students are able to do year-round on-site research and study of desert plants and animals at this large preserve in the moderate desert climate of south-western Utah.

Miscellaneous Campus Facilities

On the Provo campus are greenhouses, gardens, an arboretum, a small animal vivarium, and a tissue culture room. Laboratory facilities include gas chromatography-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultra centrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectroscopy, and many other items.

Research Projects

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both externally and internally. Some of these are:

1. **Iron Uptake by Plants.** Because some plants have an efficient iron-transport system at the root surface that is controlled by a single gene, researchers postulate that a logical solution to the worldwide problem of iron-deficiency anemia may be to increase the iron content of certain foodstuffs.
2. **Shrub Genetics, Ecology, and Physiology.** Researchers are investigating the differences in photosynthetic growth rates and water-use efficiency in various shrubs to determine their value as browse for cattle and wildlife.
3. **Biochemical Ecology.** Scientists are studying the complex plant-herbivore interactions between host plants and insects such as the Western Pine Beetle and the Spruce Bud-worm.
4. **Photosynthetic Rate and Water-Use Efficiency in Plants.** Efforts to increase the value of plants as browse for cattle and wildlife, to assist in revegetation of disturbed lands, and to increase efficiency of food production are in progress.
5. **Plant Growth Regulators.** Research is being conducted on both basic and applied aspects of chemical plant growth regulation. The focus of the applied research is on the potential uses of plant growth retardants on floricultural crops, turf grass, and woody ornamentals. Cross-commodity projects dealing with the uses of growth regulators for propagating and controlling postharvest quality of horticultural crops are also in progress. The basic research deals with the effects of plant growth regulators on senescence, stress physiology, and photosynthesis.
6. **Forage Research.** At the agriculture station, cooperating agronomists and animal scientists are conducting studies on fertility and plant density levels, harvested dry matter levels of silages, and the influence of that on field yields, nutrient content, and animal production. A ten-year multidepartmental palatable shrub production

- and grazing study in cooperation with the USDA Forest Shrub Laboratory is observing the culture and production parameters of exotic shrub species for potential livestock and game grazing.
7. **Economics in Agriculture.** Research is conducted on natural resources issues, dairy economics, and the structure of agriculture.
 8. **Molecular Biology of Gene Expression in Mitochondria.** Projects include regulation of mitochondrial gene expression (1) in brown adipose tissue mitochondria as dietary components affect long-term regulation of thermogenesis, and (2) alteration in mitochondrial genes that affect energy expenditure, resulting in inherited obesity or thinness.
 9. **Virology and Molecular Biology.** Projects include study of the genome of Aleutian Disease Virus, which will include eventually sequencing the entire genome; study of the adeno-associated virus type 2, which requires a helper virus to reproduce itself; and a study of certain soil microorganisms to assess the genetic mobility of plasmids in a naturally occurring population. Additional genetic studies utilizing DNA recombination and mutagenesis techniques are being carried out with cyanobacteria. The passage of the genetic material from these bacteria to plants may be of particular significance in agriculture since the cyanobacteria are capable of utilizing gaseous nitrogen and carrying out photosynthesis.
 10. **Antiviral Drug Research.** Ribavirin and some other carboxamides are effective in blocking viral replication of many human and animal viruses, thus significantly altering the course of infections. The antiviral mechanism(s) of these drugs is being studied through a variety of RNA viruses that use widely different strategies to express their viral genomic information during their replicative cycles.
 11. **Cancer Research.** A variety of human cancer cells, but not normal cells, are killed by the exposure to platelets in tissue culture. Experimentation is under way on the isolation and characterization of the platelet factors that may have therapeutic significance in cancer treatment.
 12. **Vertebrate Evolution, Genetics, and Distribution.** Research has focused on evolution in Sceloporus lizards in the southwestern United States and Mexico, documented with karyological, electrophoretic, and mitochondrial DNA techniques. Studies on groups as diverse as chipmunks, rattlesnakes, and fishes are also included. Also under study are the diversity, distribution, behavior, and management of both small nongame and big-game mammals.
 13. **Evolutionary Genetics and Zoogeography of Insects.** Using recombinant DNA techniques, *in situ* hybridization, and the genus *Drosophila* as a starting point, studies pursue the evolution of karyotypes and genome structure. Studies of island mountain biogeography and the aquatic insect fauna of Mexico give us clues as to how faunas have moved between North and South America.
 14. **Marine and Freshwater Biology.** Research is performed at both Stanford University's Hopkins Marine Station and the University of Washington's Friday Harbor Laboratories. It involves SCUBA collection of field data and also laboratory analysis of sublittoral community competition for space, as well as feeding and offensive and defensive strategies of marine populations. Examples of freshwater research include community energetics and succession in lentic ecosystems, the role of physical perturbations (e.g., avalanches) on stream community structure, the systematics and evolution of native trout, and the use of cytogenetics to identify inter-specific hybrid swarms.
 15. **Sexual Differentiation of the Brain.** Various morphological, biochemical, and behavioral techniques are being used to elucidate the mechanisms regulating sexual differentiation of the brain. The mammalian brain appears to be inherently female, or at least undifferentiated. Functional and morphological characteristics of the brain that are typical of the male sex develop in response to the action of testicular hormones on the development and differentiation of the basically female brain. An understanding of the mechanisms regulating the sexual differentiation processes has profound implications for reproductive biology, animal behavior, and developmental neurobiology.
 16. **The Physiology and Biochemistry of Exercise.** Researchers are examining in detail the effect of training on retention and use of glycogen and fat reserves in rats.
 17. **Mineral and Trace Minerals Nutrition.** A variety of research projects are studying the importance of minerals and trace minerals in human nutrition, e.g., magnesium intake during pregnancy, magnesium and auditory brain stem responses, and selenium and platelet aggregation.
 18. **International Nutrition.** The major research interest is establishing the role of nutrition in human development. This involves identifying the constraints of adequate nutrition and the consequences of malnutrition in Third World countries. Linkages between nutrient deficiencies and physical stunting and/or delayed mental development are examined, and effective and appropriate assistance models are designed.
 19. **Lipid Oxidation.** Basic food lipid research is being conducted with an emphasis on lipid oxidation. Studies include oxidative stability and sensory evaluation of fractionated food lipids and optimization of processing and storage conditions to extend the shelf life of foods.
 20. **Continuous Process for Cottage Cheese.** Continuous processes have been developed for cottage cheese production, but textural problems have limited their application. Research projects funded by the Western Dairy Foods Research Center have been initiated that will help resolve this problem.
 21. **Clinical Laboratory Methods.** Improved procedures for the laboratory diagnosis of defects in iron, calcium, steroid, and lipid metabolism as well

- as hemoglobin formation and kidney function are being researched.
- 22. **Biological Science Education.** The master of biological science education involves the development and field testing of laboratory activities for use by high school biology students as well as the development of student laboratory manuals, work sheets, and comprehensive teachers' guides.
 - 23. **Sex Determination of Dairy Cattle Embryos.** Use of molecular biology techniques to determine the sex of dairy cattle embryos. The findings of this research are to be integrated into the embryo transfer program now in place at the BYU Dairy.
 - 24. **Effect of Nutrient Intake on Gene Expression.** Research explores in detail the structure and organization of the gene encoding the selenoprotein glutathione peroxidase, the mechanism of its regulation, and the dependence of that regulation on dietary intake and availability of the essential trace element selenium.
 - 25. **Environmental Science.** Research is being conducted into the various ways humans are affecting the earth's ecosystems, including studies upon the effects of air, water, and land pollution. Plant and animal interactions and destruction and preservation of natural habitats, interference with nutrient cycling and energy flow and simplification of ecosystems are also being studied.
 - 26. **Structural Plant Science.** Research in this area includes various aspects of plant anatomy, plant morphology, and ultrastructure of biological systems. Investigators also conduct ethnobotanical, paleobotanical, and taxonomic studies.

Study Facilities

Departments in the college provide study areas and/or space in research laboratories for graduate students.

College of Education

Dean: Robert S. Patterson, Professor, Educational Leadership, 343 MCKB
Associate Dean: Beverly R. Cutler, Associate Professor, Elementary Education, 343 MCKB
Associate Dean: Russell T. Osguthorpe, Professor, Instructional Science, 343 MCKB

The departments in the College of Education offer the following graduate degrees:

Educational Leadership
MEd, EdD, PhD Educational Leadership
Educational Psychology
MS Audiology
MS Counseling and Guidance
MS School Psychology
MS Special Education
MS Speech-Language Pathology
PhD Counseling Psychology
Elementary Education
MA, MED Teaching and Learning
EdD Reading
Instructional Science
PhD Instructional Psychology
MS, PhD Instructional Science

Graduate study in the College of Education has two central purposes: (1) researching educational processes and issues; and (2) enhancing the preparation of master teachers, principals, counselors, school psychologists, clinical audiologists, and other professionals in education. The goal of the College of Education is "to develop professional educators who affect both theory and practice in their field and who provide leadership that results in beneficial and significant changes." Undergirding graduate study and the preparation of professional educators is research. The general focus of research is directed by the mission of the college.

Special Facilities

Computer Laboratory with Access to VAX

Computer terminals in the laboratory provide graduate students direct line access to the university's large mainframe computers, enabling students to use several sophisticated programs, such as SPSS and SAS, to analyze research data. These terminals also enable students to search out books in the Harold B. Lee Library.

Graduate Student Project and Research Laboratory

Laboratory space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

Educational Psychology Center

This center affords students an opportunity to learn and practice a variety of applications for the principles and theories they study in their course work. Through practical applications students gain valuable experience in diagnosing learning and achievement difficulties; remediating learning and behavioral problems; consulting with parents, teachers, and other professionals regarding strategies for helping the center's clients; counseling individuals with academic, vocational, or personal problems; and giving career assessment and guidance to young people and adults.

Study Areas

Graduate study areas are available in the Project and Research Laboratory, the Science Education Laboratory, and the College of Education Learning Resource Center.

College of Engineering and Technology

Dean: L. Douglas Smoot, Professor, Chemical Engineering, 270 CB

Associate Dean, Graduate Studies: Steven E. Benzley, Professor, Civil and Environmental Engineering, 270 CB

Associate Dean, Operations: John J. Kunzler, Associate Professor, Manufacturing Engineering and Engineering Technology, 270 CB

Assistant Dean, External Relations: David K. Anthony, 280 CB

Assistant Dean, Academic Relations: Ronald E. Terry, Professor, Chemical Engineering, 270 CB

The departments in the College of Engineering and Technology offer the following graduate degrees:

Chemical Engineering

MS Chemical Engineering

PhD Engineering

Civil and Environmental Engineering

MS Civil Engineering

PhD Engineering

Electrical and Computer Engineering

MS Electrical Engineering

PhD Engineering

Manufacturing Engineering and Engineering Technology

MS Computer-integrated Manufacturing

MS CIM—Industrial

MS Manufacturing Engineering

Mechanical Engineering

MS Mechanical Engineering

PhD Engineering

Technology Education and Construction Management

MS Technology Education

In addition, the College of Engineering and Technology offers master of engineering management and master of technology management degrees.

Detailed descriptions of these degree programs appear in the five engineering department sections and the Technology Education and Construction Management Department section.

The departments offer financial aid in the form of scholarships and internships. In addition, research programs fund assistantships and research associates. For more information about these awards, consult individual departments.

Integrated Master's Program

Students who desire to obtain a master's degree in engineering, and who have been accepted to a department professional program, may elect to enter the integrated master's program at the end of the sophomore year or during the junior year of the engineering curriculum. The purpose of the program is to afford greater flexibility in scheduling course work than is normally available through a traditional BS degree followed by an MS degree program. In this program the BS degree may be received before or simultaneously with the MS degree (normally five years from freshman matriculation). Con-

sult with the specific department of interest for procedures, application forms, and other details.

Residence Requirements

The major part of the work toward the master of science thesis and the doctor of philosophy dissertation must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). *In residence* is defined as: (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project, thesis, or doctoral dissertation must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.

Research Centers, Laboratories, and Other Facilities

The College of Engineering and Technology has experienced rapid growth in funded research during the past decade. In recent years the college research budget has continued to grow steadily; the budget for the 1992-93 fiscal year exceeded \$6 million. College research organizations now have two centers, including one of the prestigious National Science Foundation engineering research centers, four research laboratories, and two state-funded centers of excellence. More than half the faculty participate in research endeavors, and a number have gained international recognition for their work. The college presently enrolls nearly 300 graduate students, some 70 of whom are in doctoral programs.

Advanced Combustion Engineering Research Center (ACERC)

Nationally recognized as a leading center for interdisciplinary combustion research, BYU was recently identified by the National Science Foundation (NSF) as the site for one of only 13 NSF-sponsored engineering research centers. Selected from among more than 100 applicants, this center has secured significant additional financial support from U.S. corporations. The center is under the direction of L. Douglas Smoot, dean of the college. Students and faculty associated with the center pursue experimentation, analysis, computer modeling, and design of combustion systems. The center is designated as a state center of excellence and as such has received additional financial support from the state of Utah.

ACERC funds several research assistantships for graduate students and research associates each year. Current key areas of research emphasis include: (1) fuels' structure and their reaction rates; (2) behavior of fuel minerals; (3) formation and control of pollutants; (4) turbulence and its interactions with chemical reactions;

- (5) comprehensive modeling of combustion systems; and
 (6) combustion process characteristics.

Advanced Composites Manufacturing and Engineering Center (ACME)

The Advanced Composites Manufacturing and Engineering Center was established to promote the use and understanding of advanced materials, largely in support of the existing composite and plastic material companies operating in the state of Utah. The center has extensive test equipment for determining physical, mechanical, chemical, and in-use properties of composites and plastic materials. The equipment includes: tensile, tension/torsion, impact, fatigue, and pressure burst equipment; differential scanning calorimeter; thermogravimetric analyzer; differential thermal analyzer; Fourier transform infrared, 40-channel data acquisition system (strain, thermocouple, etc.) and weathering, surface tension, microscopic, and SEM measuring devices. Over \$1.5 million in grants and research contracts have been received by the center since its beginning.

The basic center research includes methods of improving fiber-matrix interface bonding (especially using plasma surface treatments), crosslinking of thermoplastic matrix materials, cure-sensing techniques, new methods of manufacturing thermoplastic composites, innovative vibration damping designs, aircraft part design modification, and composite part machining. New areas of research in cooperation with consortium companies include development of plastic medical devices, plastic sprinkler stands, characterization of unique ceramic materials, and biodegradable polymers.

Catalysis Laboratory

Headed by Calvin Bartholomew, the BYU Catalysis Laboratory has a 14-year history of productive research in heterogeneous catalysis. This research is highly interdisciplinary in nature as it applies principles of kinetics, chemistry, materials science, surface science, and chemical engineering to the understanding of catalyst properties and catalytic reactions.

The Catalysis Laboratory is housed in the Chemical Engineering Department. Its principal objectives are to: (1) obtain a basic understanding of catalyst functions and their relationships to catalyst structure in energy and air pollution-related processes; (2) develop new methods and tools for catalyst study; and (3) train and educate students in the science and art of catalysis research. Present research efforts are focused on basic research in catalytic adsorption, supported metal catalysis, catalyst preparation, catalyst characterization, coal characterization and oxidation, and catalyst deactivation.

Combustion Laboratory

Organized in 1977 to bring together faculty who shared common research interests, the Combustion Laboratory maintains one of the most active and extensive combustion programs in the United States. This laboratory provided the basis for the creation of ACERC, and it continues to function as an important part of that organization. Research activities are broad and well funded and presently include coal combustion, pollutant formation, coal gasification, turbulent mixing, dust explosions,

and the modeling of gaseous and particle-laden combustion processes. Direction is given to the Combustion Laboratory by Dean Smoot as part of his activities with ACERC.

Engineering Computer Graphics Laboratory (ECGL)

This laboratory was formalized in 1985 following a decade of research and development in computer graphics under the leadership of Henry N. Christiansen of the Civil Engineering Department. During that period the faculty and graduate students associated with the lab have created computer graphics and structural analysis software that has been distributed worldwide.

The laboratory maintains a sizeable array of hardware that equips the comprehensive computer graphics research facility. Laboratory objectives include the promotion of an atmosphere of academic research related to computer-aided engineering and the development of procedures and computer codes, with special emphasis on computer graphics.

Engineering Design Methods Laboratory (EDML)

EDML was formed by an interdisciplinary group of faculty and graduate students whose common interest is the development of strategies, software tools, and understanding for increased productivity in engineering design. EDML is housed in the Mechanical Engineering Department under the direction of Alan R. Parkinson. Researchers associated with the laboratory emphasize the study of generalized methods to attack a wide range of design problems. Included among these are strategies for designing complex systems, software systems for engineering design, design/manufacturing interfaces, shape optimization in design, and modeling of systems for design. The laboratory has developed OPTDES.BYU, a software system that brings constrained optimization algorithms and analysis software together so that the design engineer can quickly explore highly dimensional design space, focus on synthesis rather than analysis, and achieve optimum designs.

Digital Signal Processing

During the past decade two professors of electrical engineering, Douglas M. Chabries and Richard W. Christiansen, have developed a comprehensive digital signal processing research program. In 1986 the state of Utah designated the program a center of excellence. This research effort includes image processing, particularly directed toward advancing techniques for transmitting compressed digital images; speech processing with application to digital signal processing in hearing aids, robotics, speech synthesis and analysis; and the design and development of design tools for VLSI.

Facilities include extensive computer resources, signal processing software tools, image display and digitizing equipment, and a sound room. All computer systems are interfaced through several parallel networks, thus permitting researchers to bring the latest capabilities to bear in their work.

Facilities

Research facilities in the College of Engineering and Technology are broad and sophisticated. Each of the previously identified centers and laboratories is well equipped with the latest research implements. In addition to equipment procured or fabricated to fulfill research obligations, industrial partners over the past half-dozen years have contributed equipment valued at \$20 million. This has created an environment that has fostered increased research endeavors and provided students with access to the very latest hardware. Generous

laboratory and office space provides graduate students with an ideal environment in which to pursue their scholarly efforts. Close cooperation with industry and governmental agencies has assured that the research activities are on the forefront of national needs, and BYU engineering researchers have gained a reputation for producing ideas, strategies, and software that have immediate application.

Information regarding other research efforts not described in this section may be found in the various departmental publications.

College of Family, Home, and Social Sciences

Dean: Clayne L. Pope, Professor, Economics, 990 SWKT
Associate Dean, Graduate Studies and Curriculum:

James M. Harper, Professor, Family Sciences, 980-A SWKT

Associate Dean, Research: Dennis L. Thomson,
Professor, Political Science, 782 SWKT

The College of Family, Home, and Social Sciences offers an extensive network of graduate programs that prepare students for academic, clinical, and field research and practice.

The departments in the College of Family, Home, and Social Sciences offer the following graduate degrees:

Anthropology

MA Anthropology

Clothing and Textiles

Economics

Family Sciences

MS, PhD Family Sciences

MS, PhD Marriage and Family Therapy

PhD Family Studies

Geography

MS Geography

History

MA History

PhD History

Political Science

Psychology

PhD Clinical Psychology

MS, PhD Psychology

SPC Certificate School Psychology

Social Work

MSW Social Work

Sociology

PhD Family Studies

MS, PhD Sociology

Interdisciplinary Program

The College of Family, Home, and Social Sciences has an interdisciplinary program in international and area studies (MA) through the David M. Kennedy Center for International and Area Studies.

Research Units

Center for Studies of the Family, 922 SWKT

Director: Bruce Chadwick, 938 SWKT

The Center for Studies of the Family is an interdisciplinary research center focusing on studies related to all aspects of the family. The institute encourages and supports research on family-related topics ranging from prenatal development to problems of aging. Many of the faculty in the college are actively engaged in such research and are fellows of the center. Activities of the cen-

ter include weekly symposia for sharing and evaluating the findings of faculty and graduate research, publication of a multidisciplinary journal of family life, and an annual research conference.

Women's Research Institute, 970 SWKT

Director: Marie Cornwall, 978 SWKT

Initially established in 1978, the Women's Research Institute became a part of the College of Family, Home, and Social Sciences in September 1983. Since then the institute has awarded research fellowships to upper-division and graduate students for conducting research on women and women's issues in amounts up to \$500 annually for selected projects. Faculty grants became available through the institute in 1984.

Comprehensive Clinic

Director: Leslie Feinauer, 244 TLRB

The Comprehensive Clinic at Brigham Young University is a unique interdisciplinary training and research facility housing the finest video and computer facilities available and a staff of skilled technicians and secretaries to support graduate student and faculty research. The clinic currently functions as a training facility for an APA-approved clinical psychology PhD program, AAMFT-approved marriage and family therapy PhD and MS training programs, a certified MSW training program, a public nursing program, and an audiology and speech-language pathology MS training program. In addition, the clinic provides the university and the broader geographical community with mental health services and serves between 200 and 250 clients each week. The clinic contains eleven counseling rooms, four seminar rooms, and two large audiology and speech-language pathology classrooms equipped with video cameras and portable playback units. Fourteen small session rooms are equipped for audio recording.

The participating departments in the clinic also provide curricula and experience in settings outside the clinic through internships and community education activities. Each department provides additional research and clinical facilities designed to reinforce and integrate student classroom learning in a practical environment. In the Psychology Department, for example, students can enhance their knowledge of research methodology and laboratory procedures by participating in class-related laboratory experiences or faculty-sponsored research programs.

Joseph Fielding Smith Institute for Church History

Director: Ronald K. Esplin, 128 KMB

The institute's purpose is to study the Latter-day Saint past. Its personnel are historians whose primary work is writing and publishing for professional and general Church audiences. The institute also seeks to facilitate

the research of other Church history scholars by providing limited support for research and publication.

Museum of Peoples and Cultures

Director: Joel Janetski, 105 ALLN

Closely associated with the Anthropology Department, the Museum of Peoples and Cultures offers unique research opportunities for students and faculty, several of whom have research offices in the museum. Located south and west of campus in Allen Hall, the museum holds a number of important archaeological and ethnographic collections that have not been systematically analyzed and reported. These collections, which represent Utah Valley, the American Southwest, and Mesoamerica, as well as other parts of the world, provide material for thesis topics, professional publications, and academic credit. Research entities in the museum include the Archaeological Technical Laboratory, which specializes in botanical and minerals analysis, and the Office of Public Archaeology, one of the most active archaeological contracting organizations in the intermountain area, with a permanent staff of eight. The Office of Public Archaeology has recently made a major commitment to research on the Western Anasazi.

Charles Redd Center for Western Studies

Director: William A. Wilson, 4069 HBLL

Established in 1972 under an endowment from Charles Redd, a prominent Utah stockman and philanthropist, the center is charged with promoting the study of all aspects of the American West. The center publishes a monograph series, assists faculty and student research through grants and fellowships, and sponsors lectureships each year.

Jerusalem Center for Near Eastern Studies

Director: Robert C. Taylor, 309 HCEB

On Mount Scopus, overlooking the Holy City, BYU's newly completed Jerusalem Center for Near Eastern Studies provides extraordinary educational opportunities for students and scholars. A seven-tiered, 120,000-square-foot structure, the center houses an extensive learning resource area, classrooms, dormitories, galleries, exhibits, a library, and auditoriums. Scholars and visitors from other universities, as well as students enrolled in its academic programs, are served here. The center's library, for example, offers a selected collection of contemporary Holy Land readings, rare books, special collections, and accessible computer data. For information concerning opportunities for graduate study in Jerusalem, call or write Kent Jackson, chair of Near Eastern Studies (211 HRCB). Travel study information can be obtained from the director of the Jerusalem Center.

Libraries, Archives, and Other Facilities

1. **Wirthlin Public Opinion Archives.** The Political Science Department houses these archives, which contain extensive information on political science and public policy issues. Corollary activities in the department are a Voting Behavior Studies Workshop and a Policy Research Workshop.
2. **Psychology Library.** The Psychology Department maintains a small library that includes twenty major journals plus important reference works.
3. **Home Economics Library Resource Center.** Special resources available to graduate students include journals, carrels, and laboratory facilities with specialized equipment.
4. **Family, Home, and Social Sciences Computing Center.** The center assists faculty and students with social science data processing and other computing needs on mainframe and personal computers. Technical support and consultation services for both statistics and graphics are available to students working on research projects, theses, and dissertations.

Special computer facilities in the Psychology Department include time-share systems. These allow the simultaneous gathering of acoustical and voice perception data from human subjects and the gathering of learning and behavioral economics data from animal subjects.

Laboratories

1. **Cartography Laboratory.** Housed in the Geography Department, this laboratory contains standard cartographic equipment plus a copy camera, a dark room, and printing facilities needed for map production. Students also have access to a geographic information system (using a VAX computer) shared with two other departments.
2. **Early Childhood Laboratories.** Associated with the Family Sciences Department, these excellent facilities provide a practicum setting in which graduate students develop skills in conducting and interpreting research involving small children.
3. **Psychobiology Research Laboratories.** These laboratories are equipped with facilities for analysis of the relationships between brain function and behavioral expression in animals. Specifically, brain anatomical analyses can be done, and patterns of brain electrical activity can be studied.

The college also provides additional research and academic support through the Camilla Eyring Kimball Chair of Home and Family Life, the Lemuel H. Redd, Jr., Chair in Western History, the J. Fish and Lillian F. Smith Chair of Economics, and the Family History Services unit.

College of Fine Arts and Communications

Dean: Bruce L. Christensen, Professor, Communications, A-410 HFAC

Associate Dean, Graduate Studies: David M. Randall, Professor, Music, A-410 HFAC

The departments in the College of Fine Arts and Communications offer the following graduate degrees:

Art

MA Art History

MA Art Education

MFA Studio Art

Communications

MA Communications

Design

Music

MA, MM, PhD Music

Theatre and Film

MFA Theatre, Design, and Technology

MA, PhD Theatre and Film

Graduate study in the College of Fine Arts and Communications provides students with a substantial theoretical base and with extraordinary performance and professional opportunities. The college and the departments in the college supervise the publication of a daily campus newspaper and an on-air radio and television station. The Harris Fine Arts Center, which houses the college, contains five speech and drama theatres; two concert halls; two art galleries; journalism, advertising, and broadcast laboratories; and practice rooms for music, dance, and theatre.

Special Facilities

Museum of Art

BYU's new Museum of Art is a striking example of art in its architecture. Designed both to receive and reflect light, the building's three levels feature a variety of display and instructional areas. Each area of the museum, from the permanent collection galleries to the gallery of Asian art, the intimate print and drawing gallery, the sculpture court, the musical instrument galleries, and the various gardens, is enhanced by its setting and decor. Of special interest to students are the study center and research library associated with the museum.

BYU's growing permanent collection contains more than 13,000 art pieces representing all major artistic styles in painting, sculpture, print work, and the decorative

arts. Highly prized are the collections of Oriental art featuring Ming and Ch'ing Dynasty jade and art depicting the landscape and inhabitants of the American West.

Art History Slide Library

A major resource for graduate student research and teaching, the slide library houses a collection of 80,000 slide reproductions of paintings, sculptures, architectural structures, and various minor arts. Furthermore, a number of students work in the library on assistantships or internships, some of them doing special research with the collection. A computerized indexing system enables a student to seek and find materials under broad categories of iconographic content—for example, art work dealing with animals, death, or certain kinds of landscapes.

Communications Research Center

As the heart of the Communications Department research program, the center provides logistical and technical assistance for major research projects. The two-room complex includes computer work stations and a room for data collection and analysis. Here graduate students work with faculty members or receive guidance on their own research in broadcasting, journalism, advertising, public relations, and speech communication.

Radio and Television Studios

In these regular, on-air facilities, graduate students, particularly those in communications, find numerous opportunities to hone their professional skills and engage in experimental projects.

Theatres

Three major theatres in the Harris Fine Arts Center serve as laboratories for graduate students in acting, directing, and technical theatre.

Concert and Recital Halls

Graduate students have opportunities to perform individually and with groups in both the Madsen Recital Hall and the de Jong Concert Hall in the Harris Fine Arts Center.

Art Studio Space

Excellent studio space for painting, printmaking, and sculpture are provided for graduate students in the Harris Fine Arts Center and at two other locations.

College of Humanities

Dean: Randall L. Jones, Professor, German, 2054 JKHB

Associate Dean: Edward A. Geary, Professor,
English, 2054 JKHB

Associate Dean: Cheryl Brown, Associate Professor,
Linguistics, 2054 JKHB

The departments in the College of Humanities offer the following graduate degrees:

Asian and Near Eastern Languages

English

MA English

French and Italian

MA French Studies

Germanic and Slavic Languages

MA German Literature

Humanities, Classics, and Comparative Literature

MA Comparative Literature

MA Humanities

Linguistics

MA Linguistics

TESL Certificate Teaching English as a Second Language

MA Teaching English as a Second Language

Philosophy

Spanish and Portuguese

MA Portuguese

MA Spanish

The Collegewide Language Acquisition Program offers an MA with specializations in the following languages:

Arabic

German

Portuguese

Chinese

Japanese

Russian

French

Korean

Scandinavian

Graduate study in the humanities prepares a student with the skills and methods to deal independently and in depth with the major manifestations of human culture—language, literature, the arts, and ideas. Departmental and collegewide programs have been designed to help students critically interpret the materials of the humanities. These programs require careful study of original and secondary sources, development of critical skills, rigorous analysis of language, and precise writing of papers, theses, and other research projects. Most programs make intensive use of the library and its resources. Graduate study differs from undergraduate work in placing the primary responsibility for developing a coherent program and for mastering materials directly on the individual student. Independent study, both within and without formal courses, replaces requirement-directed schooling. In addition to the pleasure and stimulation it provides, graduate education in the humanities is valuable preparation for teaching, scholarship, and other professional training.

Academic and Research Support Areas

Humanities Research Center

Director: Jerry W. Larson, 3060 JKHB

The Humanities Research Center provides an array of technological tools, resources, and expertise to foster quality research and scholarship in the College of Humanities. The center is especially active in the production of teaching and research materials. For example, it houses a Kurzweil Optical Scanner, which has made possible, among other publications, the generation of concordances and dictionaries on particular writers. In addition to computer and audio equipment, the center has a variety of video capabilities. Along with providing research support, the center has in the past few years become a world leader in computer-assisted language instruction and translation.

Center for the Study of Christian Values in Literature

Director: Jay Fox, 3134 JKHB

The center was established in 1980 to affirm the importance of religious and moral values in the creation and study of imaginative literature. It provides both a focus for activity and an encouragement to students, teachers, writers, scholars, and readers who believe in the importance of a value-centered literary tradition. In addition to sponsoring a variety of programs and activities, the center publishes a journal, *Literature and Belief*, and a monograph series.

Reading-Writing Center

Director: Penny Bird, 1010 JKHB

The center was established to assist students and faculty in improving their reading and writing skills. Graduate students benefit particularly from critical evaluations of drafts of seminar papers and theses. Graduate students with advanced reading and writing skills may serve as interns in the center.

Intensive Language Experiences

English Language Center

Academic Coordinator: C. Ray Graham, 2113 JKHB

Administrative Coordinator: Glen W. Probst, 2113 JKHB

The English Language Center offers a program of intensive English language training. Graduate students in Teaching English as a Second Language (TESL) may use the center as part of their training.

Foreign Language Student Residence

Coordinator: Hans W. Kelling, 4088 JKHB

Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may

apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language. Inquiries should be directed to the coordinator or to the appropriate departmental advisor for detailed information concerning opportunities for men and women in French, Russian, Italian, German, Japanese, Spanish, Chinese, Arabic, Korean, and Scandinavian languages. Graduate students may participate as students or senior residents.

Summer Language Institute

Director: Hans W. Kelling, 2007 JKHB

During the summer term the College of Humanities offers a program that allows a student total immersion in

a foreign language while receiving course credit. Housing is provided for participants where the language can be applied on a practical level. Employment is available for graduate students.

Collegewide Graduate Program in Language Acquisition

Coordinator: Randall J. Lund, 4081-A JKHB, 378-4961.

The College of Humanities offers a collegewide program in language acquisition.

J. Reuben Clark Law School

Dean: H. Reese Hansen, 348-A JRCB, 378-6383
Associate Dean: J. Clifton Fleming, Jr., 510 JRCB,
378-2485
Associate Dean: Constance K. Lundberg, 393 JRCB,
378-3210
Associate Dean: Scott W. Cameron, 342 JRCB, 378-6386
Assistant Dean: Kathy D. Pullins, 338 JRCB, 378-5576

Programs

Juris Doctorate (JD)

The J. Reuben Clark Law School offers a six-semester course of graduate professional study leading to the juris doctorate (JD) degree. Information about legal education, admissions standards and procedures, and related matters can be obtained from the J. Reuben Clark Law School Bulletin, which is available through the admissions office of the Law School.

Master of Laws (LLM)

The master of laws (LLM) degree is conferred upon successful completion of a minimum of 24 credit hours earned during at least two semesters in residence following completion of a JD degree or its equivalent outside the United States. Information and applications are available through the admissions office of the Law School.

Special Facilities

J. Reuben Clark Law Building

One of the finest university law school facilities in the country, the J. Reuben Clark Law Building is attractively located on the eastern edge of the campus. Its five floors house nine classrooms, three seminar rooms, a student commons area, a student lunchroom, and ample spaces for student organizations and activities, as well as faculty offices and a law library.

Law Library

Ranking now among the nation's larger law libraries, BYU's law library contains more than 300,000 volumes or equivalents available for student and faculty use. Besides the latest in technological facilities and services, the library also contains 450 individual study carrels that provide privacy and quiet for each law student. Law students also have access to the holdings in the university library, the Harold B. Lee Library.

Special Programs and Activities

Cocurricular Programs. In addition to the *Brigham Young University Law Review*, law students publish the *Journal of Public Law* and the *Journal of Law and Education* and participate in board of advocates and trial advocacy programs. The cocurricular programs extend law review experience to a larger number of students than would be possible through a single journal.

Other Special Programs. Students obtain experience in trial and appellate practice patterned after the old English Inns through the American Inn of Court I. Minority students may participate in annual summer institutes sponsored by the Council on Legal Education Opportunity and a scholarship program in law for American Indians funded by the Bureau of Indian Affairs.

Student Organizations. Within the Law School, students may participate in a number of organizations, among them the Student Bar Association, the Women's Law Forum, the Family Law Society, the Government and Politics Legal Society, the International and Comparative Law Society, the Minority Law Students Association, the American Indian Law Students Association, and the Natural Resources Law Forum. There are two chapters of legal fraternities on campus and a Law Partners organization for spouses of married law students.

J. Willard and Alice S. Marriott School of Management

Dean: K. Fred Skousen, Professor, Accounting, 730 TNRB

Associate Dean: Gary C. Cornia, Professor, Public Management, 730 TNRB

Associate Dean: Milton E. Smith, Professor, Business Management, 730 TNRB

Associate Dean: William R. Siddoway, 710-A TNRB

Marriott School of Management

The Marriott School of Management is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice.

Special Facilities, Programs, and Activities

The N. Eldon Tanner Building, which houses the Marriott School of Management, is one of the finest facilities of its kind. Surrounding the dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

Marriott School of Management National Advisory Council

Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School of Management. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop

funding sources for scholarships, and provides professional development for faculty members.

Executives on Campus Program

This program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and Entrepreneurship Lecture Series.

Professional Programs

The Marriott School of Management comprises four professional programs:

Master of Business Administration

Master of Public Administration

Master of Accountancy

Master of Organizational Behavior

These programs are designed to prepare qualified students for rewarding careers in management and administration. Classes and study group activities stress the acquisition of professional managerial attributes that will enable students to obtain positions of leadership in public, private, and not-for-profit organizations.

The Marriott School of Management publishes its own catalog describing programs in detail. Prospective applicants should write directly to the dean's office to obtain a copy.

Managerial Economics

The Department of Managerial Economics offers a graduate degree program leading to a master's degree in managerial economics. Students should apply for this program through the Office of Graduate Studies rather than the Marriott School of Management.

College of Nursing

Dean: Sandra Rogers, Associate Professor, Nursing, 593 SWKT, 378-4144

Associate Dean, Curriculum: Lee Duke, Associate Professor, Nursing, 594 SWKT, 378-5375

Associate Dean, Student Affairs: Mary Williams, Associate Professor, Nursing, 591 SWKT, 378-5626

Associate Dean, Scholarship: Elaine Sorensen, Associate Professor, Nursing, 450 SWKT, 378-2747

The College of Nursing offers a nationally accredited program leading to the master of science degree. Areas of specialization include: family nurse practitioner and nursing administration. The program's purpose is to prepare advanced practitioners and administrators with an extensive body of nursing knowledge and a high level of competence in an advanced area of clinical nursing practice.

Research Support Facilities

Research Center, 454 SWKT

Coordinator: Elaine S. Sorensen, 450 SWKT

The research center, available to faculty and graduate students, is equipped with computer stations and software supporting statistical quantitative data analyses and qualitative data analyses. The center has graphics capability and assists in the preparation of research reports, articles, and presentations.

Physiology Laboratory, 488 SWKT

Coordinator: Gary Measom, 486 SWKT

The physiology laboratory is well equipped to support physiological studies by students and faculty. Instru-

ments are available to evaluate protein and amino acids in body fluids such as blood, saliva, and human milk. Researchers have evaluated the immunological system using electrophoresis, isoelectric focusing, and radioimmuno assay. They have also conducted research to determine the energy content of human milk and the concentration of glycosylated hemoglobin levels and to study proteins utilizing immunological techniques. The laboratory contains physiograph equipment and an animal room for studies using animal models. Microscopes, electrophoretic equipment, and a bomb calorimeter are also available.

Nursing Clinic, 162 TLRB

Coordinator: Vickie Anderson, 162 TLRB

This clinic is an important component of the Comprehensive Clinic described in the College of Family, Home, and Social Sciences. Staffed with a full-time nurse practitioner, the Nursing Clinic serves clients from the community, gives students practical clinical experience, and supports research in the College of Nursing.

Study Facilities

Clinical agencies in urban and rural Utah are settings for advanced practice residencies. Many of these institutions maintain continual clinical research programs and innovative management strategies appropriate for graduate students. Nurse practitioner clinics and rural practitioner sites also offer a challenging experience in developing as an independent practitioner. A graduate study room is available on the fifth floor of the Spencer W. Kimball Tower.

College of Physical and Mathematical Sciences

Dean: William E. Evenson, Professor, Physics, 1140
TMCB

Associate Dean: Bill R. Hays, Professor, Computer
Science, 1148 TMCB

The departments in the College of Physical and Mathematical Sciences offer the following graduate degrees:

Chemistry

MS, PhD Biochemistry

MS, PhD Chemistry

Computer Science

MS, PhD Computer Science

Geology

MS Geology

Mathematics

MA Mathematics Education

MA, MS, PhD Mathematics

Physics and Astronomy

MS, PhD Physics

PhD Physics and Astronomy

Statistics

MS Statistics

Financial Aid. Graduate students can apply for one or a combination of the following types of financial aid: teaching and research assistantships, scholarships, internships (university-sponsored fellowships), and tuition awards. Financial aid is awarded on the basis of merit and availability of funds.

Active in research that supports quality graduate work, the College of Physical and Mathematical Sciences has a number of special facilities and programs that enhance graduate study.

Research Centers and Services

State Centers of Excellence

The state of Utah has established and funded a number of research and development Centers of Excellence, four of them with the principal investigators in the College of Physical and Mathematical Sciences. Patterned after a National Science Foundation project, the centers promote joint efforts between the university and industry in the development of certain needed technologies. The college's four centers are in X-ray imagery, chemical separations, computer-aided education, and supercritical fluid separation technologies.

X-Ray Imagery Center of Excellence and Laser Physics Group. At present heavily involved in the development of advanced X-ray imaging and X-ray spectroscopy, the laser program is an interdisciplinary effort involving physics, chemistry, and electrical engineering. The award from the state will help finance expanded research into producing optical devices to manipulate soft X rays. With such devices, X rays might be used to see the struc-

ture of living cells, to make smaller and faster computers, and to improve defense against ballistic missiles. Collaborative efforts have been established with Lawrence Livermore National Laboratory, Los Alamos National Scientific Laboratory, and the Materials Science Department at Stanford University. Students have the benefit of both the university environment and the possibility of interaction with physicists in major laser programs throughout the country.

Chemical Separations Center of Excellence. The chemical separations group will be engaged in designing and building chemical separations systems that can selectively bind specific chemical structures with certain ions or molecules. The group hopes, among other things, to find ways to separate enantiomeric forms of chemical compounds and trace metals from solutions.

Computer-aided Education Center of Excellence. The computer-aided education group is interdisciplinary but is based in the Computer Science Department's instruction program. The group will work toward developing improved software for computer-based instruction, especially productivity tools for the creation and delivery of courseware and the application of artificial intelligence techniques to the creation of adaptive teaching systems.

Advanced Supercritical Fluid Separation Technologies Center of Excellence. The center is developing and testing instrumentation for the use of supercritical fluids in analytical chemistry applications. Capillary supercritical fluid chromatography is a new analytical technique first successfully demonstrated at BYU. Researchers are pursuing improvements to ensure reliability and instrument simplicity and to improve methods of sample introduction, separation, and detection. A major goal is to investigate possible application to agrochemicals, surfactants, dyes, carbohydrates, lipids, peptides, nucleosides, metabolites, steroids, and pharmaceuticals.

Center for Thermodynamics

Coordinator: Julianne Boerio-Goates, 139-C ESC

The center was established to correlate the research activity in chemical thermodynamics in the Departments of Chemistry and Chemical Engineering. It facilitates the exchange of ideas and information and coordinates the use of the many sophisticated instruments used to make thermodynamic measurements. Calorimetry is an especially strong part of this program, which also includes research in phase equilibria, solution thermodynamics, and electrochemistry. Eighteen full-time personnel are formally affiliated with the center and are involved in thermodynamic research.

Cancer Research Center

Director: Byron K. Murray, 857 WIDB

The objective of the BYU Cancer Research Center is to make significant scientific contributions toward the control and cure of cancer. Intense investigations of oncogenes and their relation to the development of cancer represents a major activity within the center. Research projects are being supervised by twenty senior investigators from the Graduate Section of Biochemistry and the College of Biology and Agriculture. It is the combination of their research efforts that will ultimately achieve excellence and enable the stated objective to become reality.

Center for Statistical Research

Director: H. Gill Hilton, 223-C TMCB

The center operates under the Department of Statistics, with full access to all departmental resources, to provide statistical expertise to faculty, graduate students, and off-campus researchers in other disciplines. Areas of particular strength are designing experiments and sample surveys and analyzing the resulting data. Problems are solved by application and adaptation of state-of-the-art methodology and development of new methodology as required.

Research Programs and Facilities

Acoustics

The acoustics research program is strongly cross-disciplinary in character and focuses on the following areas: music, speech, architecture, and noise. Most of the research in acoustics involves simulation of physical systems and signal processing of music and speech. Ready access is possible to a MicroVAX network, including a NeXT computer equipped with hardware and software for data acquisition and manipulation.

Astrophysics and Astronomy

Most research in astrophysics and astronomy is observational, much of it conducted with the BYU twenty-four-inch telescope at West Mountain Observatory, twenty miles southwest of campus, which, at 6,800 feet elevation, is a relatively dark, haze-free site. There is also frequent use of observatories in Arizona, California, and Chile. Topics of current or recent research include the evolutionary status of variable stars, especially classical and dwarf Cepheids; the reliability of secondary photometric standards; population II stars; interstellar reddening; the development status of both old and young galactic star clusters; globular star clusters; the galaxian luminosity function; and the photometry of rich galaxy clusters and of galaxies in or near cosmic voids.

Plasma Physics

Plasma physics research, both experimental and theoretical, centers on the relatively new area of nonneutral plasma physics. New experimental techniques are being developed to measure the distribution function of these plasmas in both configuration and velocity space. The response of the plasma to both static and time-dependent

perturbations is being studied. The theoretical work being done attempts to extend the mathematical description of these plasmas beyond the simple approximate geometries and fluid models that have been used in the past.

Condensed Matter Physics

A large variety of topics are being investigated. Efforts are centered on studies of phase transitions in crystalline solids. Interest is in phase diagrams, symmetry changes at the transition, critical phenomena, etc. A number of experimental techniques are applied: dielectric measurements, electrical resistivity measurements, electron spin resonance (EPR), and nuclear magnetic resonance. These studies can be made at high pressure (up to 50 kbar). Theoretical aspects of phase transitions are also being studied. An emphasis is made on the symmetry change at a phase transition. Computer algorithms have been written to systematically answer many of the questions for a given symmetry change.

Theoretical studies are also underway on the interaction of nuclear electromagnetic movements in solids with electromagnetic fields in the material. Realistic models have been calculated of dynamic effects on hyperfine interactions of rapidly moving vacancies.

Theoretical Physics

There is work in the following areas: modeling of the electrostatic and the electromagnetic radiation field of molecules; methods of Bayesian statistics for a more careful and accurate physical interpretation of the information acquired from a sequence of quantum measurements; formulation of quantum electrodynamics (QED) without divergences; solutions of coupled equations for the electron and photon propagators in the nonperturbative regime of QED; relativistic electron theory; differential forms; Backlund transformations and symmetry groups to search for methods of finding exact solutions for certain partial differential equations of mathematical physics; molecular dynamics of defects and impurities in clusters and solids; algebraic methods applied to energy transfer in molecular systems.

Computer Science Programs and Laboratories

1. **Computer-based Instruction Program.** See preceding State Centers of Excellence section.
2. **Operating Systems Laboratories.** The Computer Science Department has advanced course work and laboratory facilities to support research in real time process control and in concurrent and distributed processing. Studies are under way on the creation of programming languages and operating systems that will enhance the use of concurrent processes in a distributed environment.
3. **Computer Graphics Laboratories.** Graphics research in the Computer Science Department concentrates on the representation of hyperdimensional objects and on the automatic generation of interactive software for graphical presentations. Current projects include shadowing and shading hyperdimensional objects, creating visual and

graphical programming languages, and generating high-quality user interfaces.

4. **Computer Vision Laboratory.** Research in computer vision deals with the recognition and description of two-, three-, and four-dimensional patterns from two-dimensional images. Current projects include extraction and interactive display of three-dimensional medical anatomy and boundary tracking for image segmentation. Future research will address the use of vision in robotics.
5. **Artificial Intelligence and Expert System Laboratories.** Investigations of artificial intelligence techniques are conducted for the automating of problem-solving processes that are informal, heuristic, and symbolic in nature. Research currently includes implementation issues, knowledge representation, prototypes and their validation, fuzzy logic, measures of belief, certainty theory, Bayesian probability theory, and logical inferencing.
6. **Interactive Software Systems Laboratory.** This laboratory produces tools that can automatically generate user-interface software. Such tools reduce the cost of developing user-friendly applications. The laboratory also develops techniques to measure the effectiveness of user-interface software.
7. **Networking/Communications Laboratory.** Laboratory experience is provided to students in the design and use of ethernet and packet radio networks plus the management and analysis of network performance. Further research interests are token ring, fiber optics, and microwave and satellite communications.
8. **Neural Networks and Connectionist Computing Laboratories.** Neural networks are computing architectures and learning mechanisms inspired by human brain functions. Research currently explores weaknesses of the von Neumann computer in terms of parallelism, self-organization, and fault tolerance. Targeted applications include adaptive logic devices, dynamic control, logical inference, and robotics.
9. **Object-oriented Systems Modeling Laboratory.** The mission of this laboratory is to develop theoretical foundations, professional engineering methods, and tools for creating object-oriented software and database systems. Researchers in the laboratory study software development activities including analysis, design, specification, implementation, and enhancement in terms of the principles of software engineering and database systems. The objective is to make the development of software and database systems a true engineering discipline.
10. **Laboratory for Applied Logic.** This laboratory supports research into computer dependability. The name stems from the focus on the lab, which is to develop the mathematical tools and engineering methodology that will enable engineers to design and build dependable computer systems. Mathematical analysis of computer software and hardware is not an easy task; every formal analysis done to date has been a virtuoso performance, carried out by experts in logic, specification, and me-

chanical reasoning. The goal of LAL researchers is to make the formal modeling and analysis of computer systems tractable for working software and hardware design engineers.

Earth Science Museum

Associated with the Geology Department, this developing museum with affiliated laboratories houses major fossil groups, including one of the best dinosaur collections in the country. It also offers significant, and in some cases unique, assemblages of rocks, minerals, and maps, providing many research opportunities for faculty and students.

Fission Track Dating Laboratory

This laboratory provides the Geology Department with the geochronological potential to solve problems in stratigraphy and structural geology, to determine rates of uplift and subsequently to aid in thermal modeling, and to provide support for numerous other faculty and student research projects where dating of events is necessary. The laboratory is fully equipped, but samples are sent elsewhere for irradiation.

Calorimetry

More than twenty different calorimeters are functioning in current research projects in the Chemistry Department. Developments at the forefront of calorimetric design, construction, and application are being pursued in flow, mixing, injection, batch, titration, and scanning methods involving isothermal, adiabatic, isoperibol, and conduction calorimetry from ambient to extremes of both temperature and pressure.

Environmental Chemistry

Environmental studies are being conducted on chemistry in the air, soil, water, and complex biomolecules. In the air studies, emphasis is placed on determining chemical species and reactions in both the gas and particulate phase and on source apportionment of pollutants in indoor and outdoor air. An integrated analytical system is being developed to detect and identify trace organic pollutants for a broad spectrum of complex environmental matrices. Researchers with training in physical, inorganic, analytical, and nuclear chemistry, nuclear physics, and toxicology work cooperatively. Research facilities include environmental chambers and ambient air sampling equipment. Techniques include calorimetry, ICP, electron microscopy, chromatography (IC, SFC, GC, GC/MS), particle-induced X-ray and gamma-ray emission spectroscopy (PIXE and PIGE), Rutherford backscattering, and extended X-ray absorption fine structure (EXAFS) measurements.

Molecular Structure Studies

A recently acquired, state-of-the-art, superconducting nuclear magnetic resonance spectrometer (operating at 500 MHz) ensures that the Department of Chemistry is well equipped to carry out detailed structural work on large and complex molecular systems. This high-field instrument, together with excellent mass spectrometry, X-ray diffraction, and Fourier transform infrared instru-

mentation, helps to establish a first-rate analytical and molecular structure-determining facility.

Chemical Separations

The Chemistry Department has extensive programs in chemical separations. These include the design of new instrument techniques and stationary phase materials for capillary gas and supercritical fluid chromatography and the design of new silica gel-bound metal ion complexing ligands for use in the selective liquid chromatographic separation of metal ions. The department has the necessary gas, supercritical fluid, and liquid chromatography equipment for the analytical portion of this research. Equipment for the synthetic organic chemistry portions of these projects includes high-resolution NMR, FTIR, and mass spectrometers.

Statistics Quality Science Laboratory

The role of the Quality Science Laboratory is to facilitate the study and development of tools and techniques for improving the quality of products and services in the industrial, service, and government sectors. The Department of Statistics has administrative responsibility for

the laboratory, but it is used by students from various parts of campus for study in quality technologies as well as to further research in the technology of quality control and improvement. Through the support of various industries, the laboratory is furnished with the latest computer equipment and automated measurement equipment for the collection and evaluation of quality-related data.

Graduate Section of Biochemistry

Chair: S. Scott Zimmerman, 693 WIDB

Offering MS and PhD degrees through the Chemistry Department, the Graduate Section of Biochemistry was established to foster research in areas of biochemistry, including molecular biology, and to encourage cooperation among faculty members trained in chemistry and biology. Areas of research include molecular biology of viruses, oncogenes, and chloroplast DNA; enzymology relating to nucleotide metabolism; and biochemical properties of small peptides in terms of their structure and reactions with cell membranes.

College of Physical Education

Dean: Elmo S. Roundy, Professor, Physical Education, 212 RB

Associate Dean, Graduate Studies: Joyce M. Harrison, Professor, Physical Education, 214 RB

Associate Dean: Jay H. Naylor, Professor, Recreation Management and Youth Leadership, 212 RB

The departments in the College of Physical Education offer the following degrees:

Dance

MA Dance

Health Sciences

MS Health Sciences

Physical Education

MEd Physical Education

MS Exercise Science and Athletic Training

EdD Physical Education Administration, Curriculum, and Instruction

PhD Corrective Physical Education and Rehabilitation

PhD Exercise Physiology

Recreation Management and Youth Leadership

MA Recreation Management and Youth Leadership

Research Support Facilities

Human Performance Research Center

Administrator: Garth Fisher, 116 RB

The primary purpose of the center is to support applied and basic research programs of faculty and graduate students on such topics as nutrition and exercise, drugs and exercise, exercise and cardiovascular disease, exercise and weight control, and other contemporary issues in exercise science. Three faculty members work in the center, and a full-time staff person is available to assist with research projects.

In addition to serving graduate students and faculty in physical education, the center works closely with departments in other colleges on campus—notably in the fields of physiology, nutrition, endocrinology, and biochemistry—to broaden the scope of research projects. Graduate students who use the center pursue MS or PhD degrees from their individual departments, with emphasis in such areas as exercise physiology, motor learning, biomechanics, and corrective and rehabilitative sports medicine.

Laboratories Within the Human Performance Research Center

1. **Auxiliary Classroom and Laboratory.** This facility, which contains numerous pieces of motor learning equipment, is the primary laboratory for motor learning classes and activities.

2. **Body Composition Laboratory and Hydrostatic Tank Room.** This facility contains the necessary equipment to accurately and efficiently determine body composition parameters. With computers that assess lung volumes and capacities and that calculate body fat levels, the laboratory and tank room support studies of such subjects as obesity, training effects, and nutritional treatments.

3. **Muscle Biochemistry Laboratory.** This facility contains such sophisticated equipment as a spectrophotometer, metabolic shaker, centrifuge, cryostat, fluorimeter, tissue homogenizer, and other apparatus needed for basic research in exercise biochemistry.

4. **Ergometry Laboratory.** Equipped with a wide variety of devices for measuring work costs both at rest and during work, this laboratory supports research relating to the metabolic costs of various activities—measuring maximum oxidative capacity and evaluating the effects of various training programs on fitness.

5. **Strength Testing and Ergometer Laboratory.**

Strength and endurance testing equipment in this laboratory supports research on the effects of different training programs on strength and evaluates strength of any muscle group for any purpose.

Biomechanics Laboratory

Special cameras and other equipment, including a neumonic digitizer for quantitative analysis of motion, are available to assist researchers in the analysis of performance in sport and dance from a biomechanical perspective.

Learning Resource Center

This center contains eighteen individual study areas for graduate students as well as computer, audio, and video equipment to assist them in their work.

R e l i g i o u s E d u c a t i o n

Dean: Robert L. Millet, Professor, Ancient Scripture,
370-A JSB

Associate Dean: Donald Q. Cannon, Professor, Church
History and Doctrine, 370-B JSB

Associate Dean: Larry E. Dahl, Professor, Church
History and Doctrine, 370-C JSB

Religious Education offers graduate minors, but not
graduate majors. See Departments of Ancient Scripture
and Church History and Doctrine in the Religion section
of this catalog.

Program and Degree Resources

Religious Studies Center, 270 JSB

The dean of Religious Education is also the general director of the Religious Studies Center, which promotes research in ancient studies, the Bible, the Book of Mormon,

LDS Church history, the Doctrine and Covenants, the Pearl of Great Price, and world religions.

The center is a supporting and coordinating agency for religion-oriented research throughout the university. Concentrating on research, writing, and other scholarly activities, it is not involved in classroom instruction or degree programs.

The Richard L. Evans Chair of Christian Understanding

The occupant of the Richard L. Evans Chair of Christian Understanding promotes understanding among people of different faiths through teaching and other activities centered in Jesus Christ. The chair was established to articulate to a broad audience the Christ-centered values to which Elder Evans dedicated his life and to promote an enlightening exchange among Latter-day Saints, members of other faiths, and people of good will everywhere.

A c a d e m i c D e p a r t m e n t s , D e g r e e s , a n d C o u r s e s

Accountancy and Information Systems

School of Accountancy and Information Systems

Director: W. Steve Albrecht, 540 TNRB, 378-3154
Associate Director and Graduate Coordinator: Kevin D. Stocks, 560 TNRB, 378-4613

Faculty/Specialties

Professors

- Albrecht, W. Steve (1977) PhD, University of Wisconsin, 1975. Financial/Audit Systems.
Cameron, James B. (1969) PhD, Montana State University, 1967. Financial/Audit Systems.
Cherrington, J. Owen (1978) PhD, University of Minnesota, Minneapolis, 1972. Financial/Systems.
Gardner, Robert L. (1978) PhD, University of Texas, Austin, 1979. Tax.
Hansen, James V. (1982) PhD, University of Washington, 1973. Information Systems.
Hardy, John W. (1969) PhD, University of Texas, Austin, 1972. Managerial Accounting.
McKell, Lynn J. (1974) PhD, Purdue University, 1973. Information Systems.
Radebaugh, Lee Howard (1980) DBA, Indiana University, Bloomington, 1973. International Business.
Randall, Boyd C. (1974) PhD, University of Minnesota, 1972. Tax.
Romney, Marshall B. (1977) PhD, University of Texas, Austin, 1977. Audit/Systems Accounting.
Skousen, K. Fred, Dean (1970) PhD, University of Illinois, 1968. Financial Accounting.
Smith, Harold T. (1963) EdD, Brigham Young University, 1967. Information Systems.
Smith, Jay M., Jr. (1971) PhD, Stanford University, 1965. Financial/Audit Systems.
Stewart, Dave Nelson (1980) PhD, University of Florida, 1980. Tax.
Streuling, G. Fred (1976) PhD, University of Iowa, 1971. Tax.
Woodfield, Leon W. (1960) DBA, Michigan State University, 1965. Financial Accounting.

Associate Professors

- Boyer, Glen L. (1967) PhD, University of North Dakota, 1972. Information Systems.
Dalebout, Richard S. (1975) SJD, University of Utah, 1971. Business Law.
Hansen, Gary W. (1983) PhD, Indiana University, 1974. Information Systems.
Howe, Keith R. (1979) DBA, Arizona State University, 1979. Managerial Accounting.
Meservy, Rayman D. (1989) PhD, University of Minnesota, 1985. Audit/Information Systems.
Stocks, Kevin D. (1983) PhD, Oklahoma State University, 1981. Managerial Accounting, Information Systems.

Assistant Professors

- Cottrell, David M. (1992) PhD, Ohio State University, 1992. Managerial Accounting.
Denna, Eric L. (1988) PhD, Michigan State University, 1989. Information Systems.
Palmer, Glen O. (1964) MAcc, Brigham Young University, 1963. Tax.
Peterson, Fredric G. (1973) PhD, University of Utah, 1973. Quantitative Methods.
Prawitt, Douglas F. (1993) PhD, University of Arizona, 1993. Audit Systems/Managerial Accounting.
Spilker, Brian C. (1993) PhD, University of Texas, Austin, 1993. Tax.
Stice, James D. (1988) PhD, University of Washington, 1989. Financial Accounting.
Swain, Monte R. (1991) PhD, Michigan State University, 1991. Managerial Accounting.
Worsham, Ronald (1994) PhD, University of Florida, 1994. Tax.

The Master of Accountancy (MAcc) Program, administered through the School of Accountancy and Information Systems within the Marriott School of Management, offers a general background in accounting, with an emphasis on business-related subjects and an in-depth study of one or more areas of accounting. The MAcc degree is awarded on completion of a professional program, which can begin as early as the junior year of the undergraduate program, and culminate in the Marriott School of Management after the fifth year. Students entering the School of Accountancy and Information Systems Program with a baccalaureate degree in accounting can complete the program in less than two years.

Joint Program

The university has approved a joint program whereby qualified students may obtain both the MAcc and the JD degree during a specified period of time by meeting certain requirements.

Inquiries regarding this program should be directed to the School of Accountancy and Information Systems, 560 TNRB.

Graduate Degrees and Programs

- MAcc Information Systems
MAcc Professional Accountancy
MAcc Tax

Courses Offered

The School of Accountancy and Information Systems offers two types of courses: accounting courses with an Acc prefix and information systems courses with an ISys prefix.

Degree and Program Requirements

MAcc Information Systems

MAcc Professional Accountancy

MAcc Tax

Refer to the Marriott School of Management Graduate Catalog and the School of Accountancy and Information Systems Student Guide and Handbook for details regarding this program. The following outline does not represent the full range of requirements and opportunities in the program.

Admission and Entry

Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 28 (international)
—April 15 (U.S.)
- B. Entrance examination: GMAT.
- C. Complete GSM application.
- D. GPA: Minimum of 3.0.

Requirements for Degree

1. Required courses:

- A. First year (for students seeking BS and MAcc concurrently): SOAIS core comprising Acc 401, 402, 403, 404.
- B. Common requirements: Graduate MSM core comprising finance, management, operations, organizational behavior, management communication, management seminar, personal development, MBA 582, 680.
- C. Majors:
 1. Professional Accountancy: MBA 620-629; Acc 503, 522, 562, 612, 691R, finance elective. Elective group: 15 hours from the following, of which at least 9 must be nonaccounting. Any MSM course *not* selected above or other courses approved by program coordinator. Acc 343 and 532 count as nonaccounting courses.
 2. Information Systems: Acc 657, 691R, ISys 441, 643, 644, 645, 646. Elective group: 12 hours from the following, of which 6 must be accounting: any MSM course *not* already selected above or other courses as approved by program coordinator. Acc 343 and 532 count as nonaccounting courses.
 3. Tax: Acc 503, 523, 556, 620-624. Elective group A: 3 hours from Acc 625R, 626, 628; two of elective group B: 6 hours from the following: any MSM course *not* selected above or other courses as approved by program coordinator; 3 hours must be nonaccounting. Acc 343 and 532 count as nonaccounting courses. Tax classes are not acceptable for group B.
- II. See School of Accountancy and Information Systems for additional requirements. This program is best completed in the manner and sequence recommended by the school.

Accountancy Graduate Courses

503. Advanced Financial Accounting 3. (3)

505. Special Problems in Accounting 1. (3)

A study of partnerships, estates and trusts, and consolidations.

507. Accounting for Nonprofit Organizations. (3)

A study of accounting concepts and methods peculiar to governmental units, universities, hospitals, and other nonprofit organizations.

522. Advanced Taxation. (3)

An examination of tax laws as they apply to selected tax entities, with an introduction to tax research methodology.

523. Tax Research Methodology. (3)

An in-depth treatment of research and procedures emphasizing communication and presentation of findings.

532. Advanced Mathematics of Business. (3)

Introduction to management science. Topics selected from linear programming, sensitivity analysis, transportation and assignment method, network analysis, queuing theory, decision theory, forecasting, simulation, and discriminant analysis.

556. Computer Applications in Tax Practice. (3)

An in-depth analysis of the software and systems used in tax practice, with special emphasis on the electronic work sheet, research, and applications packages used in the tax field. The students will design solutions to various tax problems that will emphasize the "what if" type of problem resolution.

562. Financial Auditing Methodology. (3)

Financial auditing methodology and professional auditing standards necessary to conduct a modern external audit.

584. International Accounting and Multinational Enterprises. (3)

Accounting from an international perspective: flow of information in multiple currencies, complying with reporting requirements, setting budgets and monitoring performance, and controlling corporate assets through reports and audits.

586. Contemporary Professional Accounting Problems. (3)

A study in accounting problems with emphasis on problems encountered in professional CPA examinations.

599R. Accounting Internship. (1-3)

On-the-job experience and training in industry, government, or public accounting firms.

612. Managerial Cost Accounting. (3)

A study of specialized areas in cost determination and cost allocation.

616. Operational Auditing. (3)

A seminar in operational auditing, with emphasis on the business planning process.

620. Special Problems in Federal Taxation. (3)

Consideration of special property transactions, accounting periods and methods, tax payments and credit, tax concepts, and reporting tax liability.

621. Corporate Taxation 1. (3)

A study of the federal income taxation of corporations and shareholders.

622. Corporate Taxation 2. (3)

A continuation of Corporate Taxation 1. Includes consolidated returns.

623. Taxation of Partnerships. (3)

An examination of federal income taxation of general and limited partnerships and partners.

624. Taxation of Estates, Gifts, and Fiduciaries. (3)

An examination of federal taxation of property transferred by death and gift, and the federal taxation of income of trusts and estates.

625R. Current Tax Policy. (3)

An intensive study of special and current tax topics and policies.

626. Taxation of Deferred Compensation and Fringe Benefits. (3)

An examination of federal legislation and regulations treating pensions, profit-sharing plans, and other types of deferred compensation; fringe-benefit problems.

628. Taxation of Foreign Income. (3)

An examination of federal taxation of foreign transactions.

657. Management Consulting and Projects. (3)

A projects-oriented course where students get hands-on experience performing consulting jobs for businesses in Utah. Class includes both in-class instruction and business experience.

691R. Research Seminar. (3)

Using a case-based approach, this class will focus on researching accounting and on auditing professional standards. Students will learn to find answers to practical accounting problems.

692R. Advanced Topics in Accounting. (3)

Subject matter varies with the needs of students and with instructor. Subjects most often taught are fraud auditing and forensic accounting, EDP auditing, and a CPA's role in personal financial planning.

693R. Readings and Conference. (1-3)

Individualized study where students work one-on-one with a chosen professor on a topic of mutual interest. Semester credit is variable. Enrollment is by prior approval of the SOAIS director. Acc 693R provides students with an opportunity to conduct in-depth study into topics not currently covered in existing courses.

Information Systems Graduate Courses**544. Information Systems Design. (3)**

Concepts and techniques of systems analysis and design, emphasizing systems development, systems development tools, prototyping, and related topics.

546. Fourth-Generation Programming Languages. (3)

Developing skills in advanced programming languages, emphasizing four-generation languages.

548. Data Communications. (3)

Prerequisite: admission to MSM graduate program.

Principles of data communications, local and wide area networks, hardware, software, media, standards, application, implementation, and management.

643. Information Systems Analysis. (3)

Prerequisite: admission to MSM graduate program.

Advanced systems analysis and design, emphasizing information requirements, input/output analysis, and procedure documentation.

644. Advanced Information Systems Design. (3)

Prerequisite: ISys 643.

Advanced concepts and techniques of systems analysis and design, emphasizing systems development, systems development tools, prototyping, and related topics.

645. Advanced Database Analysis and Design. (3)

Advanced database organization, emphasizing conceptual and logical design, semantic modeling, database integrity, and security.

646. Advanced Fourth-Generation Programming Languages. (3)

Advanced skills development in programming languages, emphasizing fourth-generation languages.

Agronomy and Horticulture

Chair: Richard E. Terry, 275 WIDB, 378-2760

Graduate Coordinator: Laren R. Robison, 289 WIDB, 378-3825

Faculty/Specialties**Professors**

Horrocks, R. Dwain (1978) PhD, Pennsylvania State University, 1967. Crop Physiology, Ecological Modeling.

Jeffery, Larry S. (1984) PhD, North Dakota State University, 1966. Weed Science.

Jolley, Von D. (1977) PhD, Iowa State University of Science and Technology, 1976. Mineral Nutrition in Plants.

Nelson, Sheldon D. (1972) PhD, University of California, 1971. Soil Physics, Irrigation Management.

Robison, Laren R. (1971) PhD, University of Minnesota, 1962. Plant Genetics.

Terry, Richard E. (1980) PhD, Purdue University, 1976. Soil Microbiology.

Williams, C. Frank (1971) PhD, Oregon State University, 1971. Plant Propagation, Turf Management.

Associate Professor

Ellsworth, D. Delos (1975) MS, Cornell University, 1959. Real Estate Appraisal and Analysis.

Assistant Professor

Allen, Phil S. (1990) PhD, University of Minnesota, 1990. Seed Physiology, Ornamental Horticulture.

Graduate Degrees and Programs

MS Agronomy

MS Horticulture

MS Molecular Biology (Interdepartmental Program)

All candidates should obtain a copy of the Graduate Student Handbook from the department office (275 WIDB) for more information.

Areas of Specialization

Agronomy, Crop Science, Developmental Agriculture, Horticulture, Soil Science, Turf Science

Degree and Program Requirements

MS Agronomy

MS Horticulture

MS Molecular Biology (Interdepartmental Program)

Admission and Entry

I. Application requirements:

A. Semesters of entry and application deadlines:

Fall	—February 1 (international)
	—May 1 (U.S.)
Winter	—June 1 (international)
	—Sept. 1 (U.S.)
Spring	—October 1 (international)
	—February 1 (U.S.)
Summer	—December 1 (international)
	—April 1 (U.S.)

B. Acceptance by the departmental graduate coordinating committee.

C. Entrance examination: GRE General Test.

II. Prerequisite:

- A. For agronomy or horticulture (MS), baccalaureate degree in agronomy or horticulture or related field.
- B. For molecular biology (MS), baccalaureate degree in molecular biology or biological or physical science including one year of general university physics, mathematics equivalent to Math 113, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342.

Requirements for Degree

I. Credit hours:

A. Thesis option (30):

1. Minimum 24 course work hours plus 6 thesis hours (AgHrt 699R).
2. Thesis: Completion of the thesis in scientific journal format (preferred) or in standard university format.

B. Project option (36):

1. Minimum 30 course work hours plus 6 project hours (AgHrt 698R).
2. Completion of a scholarly project report.

C. No more than 9 semester hours of BYU undergraduate classes (300 and 400 level) may apply toward a master's degree.

II. Minor: Not required; students desiring a minor may choose from following list: botany, chemistry, computer science, food science, geology, geography, mathematics, microbiology, physics, statistics, range science, or zoology.

III. Examination: Final oral examination and defense of thesis or of project.

IV. Minimum requirements for molecular biology include Chem 481, 582, 586; Stat 337 or 501; Mcbio 351, 425, 441, 442, and 642 or Zool 526.

Program and Degree Resources

Benson Institute

BYU Agriculture Station

M. L. Bean Life Science Museum

Skaggs Ranch

Lytle Ranch

Greenhouses and growth chambers

Agronomy and Horticulture Graduate Courses

511. Soil Physics. (3)

Prerequisite: AgHrt 282, Chem 105, Math 113. Recommended: Phscs 121.

Physical relationships of water, heat, and gases in soils; physical and chemical properties of clays. Mathematical modeling of physical properties and transport processes.

514. Soil Microbiology. (3)

Prerequisite: Chem 106, 107, or equivalent.

Ecology and role of soil microorganisms in nutrient cycling, decomposition of organic matter and waste materials, and degradation of agricultural chemicals in soil.

520. Saline and Sodic Soils. (3)

Prerequisite: AgHrt 302, 305, Chem 105, 106, 107, Math 110.

Physical and chemical properties of saline and sodic soils and waters—their diagnosis, reclamation, and management for crop production.

540. Crop Physiology. (3)

Prerequisite: AgHrt 151, 305, 460, Botny 440.

Plant-soil-climate relationships; crop management practices related to physiological processes in plants.

550. Physiological Development of Horticultural Crops. (3)

Prerequisite: AgHrt 318, 320, 431, or 451; Botny 440.

Developmental phenomena in horticultural crops, emphasizing seed physiology, plant growth regulators, and plant stress responses.

559. (AgHrt-Botny) Plant Breeding. (2)

Prerequisite: AgHrt 459 or equivalent, Botny 341.

Genetics and methods of plant breeding related to agromanic and horticultural crops.

560. Soil and Plant Analysis. (3)

Prerequisite: AgHrt 305 or Chem 223.

Laboratory chemical analysis of soils and plant materials in soil and plant research.

595. Agricultural Experimentation: Design and Analysis. (2)

Prerequisite: Stat 501 or equivalent.

Planning, experimental design, and techniques of analysis in agriculture.

598R. Advanced Topics. (1-2)

Prerequisite: instructor's consent.

Advanced study of selected agricultural topics.

605. Soil-Plant Relationships. (3)

Prerequisite: AgHrt 282, 305; Botny 440; organic or biochemistry course.

Soil-plant nutrition including mechanisms of nutrient uptake, transfer and assimilation, mechanisms of nutrient immobilization, and toxicity in soils and plants.

694R. Seminar. (1)**697R. Research. (1-9)****698R. Master's Project. (1-6)**

For project option only.

699R. Master's Thesis. (1-9)**Animal Science**

Chair: N. Paul Johnston, 375 WIDB, 378-4294

Graduate Coordinator: Richard O. Kellem, 353 WIDB, 378-4220

Faculty/Specialties**Professors**

Hoopes, Keith H. (1957) DVM, Washington State University, 1956. Reproductive Physiology, Surgery. Johnston, N. Paul (1971) PhD, Oregon State University, 1971. Nutrition, Poultry and Small Animal Reproduction and Management.

Orme, Leon E. (1969) PhD, Michigan State University, 1958. Growth and Body Composition, Livestock Evaluation and Selection.

Pace, Ronald T. (1961) MS, Brigham Young University, 1958.

Park, Robert L. (1965) PhD, Cornell University, 1962. Animal Breeding and Genetics, Swine and Livestock Production.

Wallentine, Max V. (1962) PhD, Cornell University, 1960. Meat Science, Sheep and Livestock Production.

Associate Professors

Kellem, Richard O. (1986) PhD, Oregon State University, 1976. Nutrition, Dairy Production.

Roeder, Beverly L. (1990) DVM, Ohio State University, 1982; PhD, Pennsylvania State University, 1990. Anatomy, Physiology, Surgery, Animal Health, Nutrition.

Thwaits, Richard N (1990) DVM, Colorado State University, 1981; PhD, University of Georgia, 1991. Anatomy, Animal Health, Molecular Biology, Surgery, Physiology.

Assistant Professors

Knowles, John E. (1993) DVM, Colorado State University, 1991. Animal Health, Reproductive Physiology and Equine Medicine.

Silcox, Roy W. (1992) PhD, North Carolina State University, 1986. Reproductive Physiology.

Graduate Degrees and Programs

MS Animal Science

MS Molecular Biology (Interdepartmental Program)

Degree and Program Requirements*

MS Animal Science

MS Molecular Biology (Interdepartmental Program)

Admission and Entry**I. Application requirements:**

A. Semesters of entry and application deadlines:

Fall —February 28 (international)

—May 15 (U.S.)

Winter —June 30 (international)

—Sept. 15 (U.S.)

Spring —October 31 (international)

—February 20 (U.S.)

Summer —October 31 (international)

—February 20 (U.S.)

B. Entrance examinations:

1. GRE General Test.

2. General animal science exam.

II. Prerequisite:

A. For animal science, baccalaureate degree in animal science or in a closely related field.

B. For molecular biology, baccalaureate degree in molecular biology, physical science, biological sciences, or animal science including one year of general university physics, mathematics equivalent to Math 113, one year or organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342.

Requirements for Degree**I. Credit hours:****A. Thesis option (30):**

1. Minimum 24 course work hours plus 6 thesis hours (AnSc 699R).

2. Thesis: Completion of the thesis in standard university format or in scientific journal format.

B. Project option (36):

1. Minimum 30 course work hours plus 6 project hours (AnSc 698R).

2. Completion of a scholarly project report.

II. Required courses: Stat 501; AnSc 507; 510 or 574; 692R (each semester of residence); Zool 503, 504.**III. Minor (optional): Agronomy, horticulture, botany, chemistry, computer science, food science and nutrition, microbiology, statistics, or zoology. (Emphases in agribusiness and animal science are available.)****IV. Examinations:**

A. Written and oral examination on course work.

B. Oral defense of thesis.

*Obtain a copy of the Graduate Student Handbook from the department office (375 WIDB).

- V. Minimum requirements for molecular biology include Chem 481, 582, 586; Stat 337 or 501; Mcbio 401, 425, 441, 442, and 642 or Zool 526.

Program and Degree Resources

Benson Institute

BYU Agriculture Station

834-acre farm with a 400-cow dairy near Spanish Fork

7,800-acre Skaggs Research Ranch

15-acre Provo facility

Modern meat laboratory

Animal Science Graduate Courses

507. Advanced Animal Nutrition. (4)

Prerequisite: AnSc 207; Chem 152, 181.

Functions of nutrients in metabolism, methods for assessing nutrient utilization and requirements.

510. Advanced Reproductive Physiology. (4)

Prerequisite: AnSc 310.

Endocrinology and techniques for research and for improvement of livestock reproduction.

574. (AnSc-Botny) Introduction to Population

Genetics. (3)

Prerequisite: introductory course in genetics and in statistics.

Quantitative study of factors influencing changes in gene frequencies in natural and domestic animal and plant populations.

591R. Selected Topics in Animal Science. (0.5–3)

Prerequisite: instructor's consent.

595R. Special Problems in Animal Science. (0.5–2)

Prerequisite: instructor's consent.

599R. Cooperative Education. (2–9)

Prerequisite: department's or cooperative education coordinator's consent.

On-the-job experience in livestock or meat production practices, veterinary medicine, or research. On- or off-campus opportunities.

692R. Seminar. (1)

698R. Master's Project. (1–9)

699R. Master's Thesis. (1–9)

Anthropology

Chair: John P. Hawkins, 945 SWKT, 378-3058

Graduate Coordinator: Joel C. Janetski, 946 SWKT, 378-6111

Faculty/Specialties

Professors

Berge, Dale L. (1968) PhD, University of Arizona, 1968.
Historical Archaeology.

Forsyth, Donald W. (1979) PhD, University of Pennsylvania, 1979. Archaeology, Ceramic Analysis, Ethnohistory, Mesoamerica, Great Basin.

Hawkins, John P. (1974) PhD, University of Chicago, 1978. Social Anthropology, Ethnicity, Kinship and Family, Central America.

Matheny, Ray T. (1964) PhD, University of Oregon, 1968.
Archaeology, Ceramic Typology, Mesoamerica, Southwest.

Associate Professor

Janetski, Joel C. (1989) PhD, University of Utah, 1983.
Archaeology, Ethnohistory, Hunter-Gatherer Studies, Economics, Great Basin, Southwest.

Assistant Professors

Clark, John E. (1990) MA, Brigham Young University, 1979. Archaeology, Political and Economic Institutions, Cultural Evolution, Complex Societies, Lithic Studies, Primitive Technologies, Mesoamerica. Johnson, David J. (1987) PhD, University of Utah, 1987. Archaeology, Archeometry, Ancient Trade, Middle East, Africa.

Knowlton, David (1990) PhD, University of Texas, Austin, 1988. Cultural Anthropology, Political and Economic Institutions, Nationalism, Ethnicity, Andes.

Graduate Degree and Program

MS Anthropology

The aim of this program is to prepare (1) anthropologists capable of productive employment at a junior professional level upon receiving an MA degree, or (2) motivated students who desire to earn the PhD degree in outstanding graduate programs elsewhere.

The subject emphasis is archaeology. The department's geographical specialties in archaeology are the Intermountain West (which verges into the southwestern cultural area in southern Utah), Mexico, Guatemala, and the Middle East. The university conducts field research in each of those areas, and qualified students may participate. Also, historic site excavations in Utah, Illinois, and New York have given students experience at mining, military, village, and LDS Church history sites.

Rather than emphasize specialized or topical interests, however, the program equips the graduate with the basics of professional anthropology: a broad and versatile perspective and the ability (1) to define a research problem, (2) to choose tools wisely for approaching it, (3) to gather and analyze data efficiently and creatively, and then (4) to communicate results and recommendations effectively.

Some assistantships, grants, and employment are offered by the department and the Museum of Peoples and Cultures, but the funds are limited. An attempt is made to provide support for as many students as possible rather than generously support a few. The Office of Public Archaeology division of the museum regularly gives employment and experience to students prepared to participate in contract archaeology projects with them.

The MA program is explained in more detail in the Graduate Program Description obtainable by writing or calling the Department of Anthropology.

Degree and Program Requirements

MA Anthropology

Only a broad discussion of requirements is provided here. The department sends each prospective graduate student a detailed, step-by-step outline of expectations,

requirements, and guidelines for progress through the program (Graduate Program Description); see the department for a copy. The student must return a form indicating that he or she has read the detailed guidelines, understands them, and agrees to be governed by them. This is done because requirements sometimes change slightly in the interval between submission of catalog copy and publication of the finished catalog. By writing, calling, or visiting the department, prospective students will receive the most up-to-date and appropriate information.

Admission and Entry

- I. Semesters of entry and application deadlines:
Fall —March 1 (U.S. and international)
Winter —March 1 (U.S. and international)
- II. Application requirements:
A. GRE General Test: score should be entered on line 11 of Part D of the application form. Foreign students who do not have English as a native language must take the TOEFL exam and submit the score (577 minimum) with the application.
B. Submission of a letter of intent that specifies particular areas of interest. This letter will provide the basis for assignment of a temporary faculty advisor who will work with the applicant until a thesis committee is organized.
- III. Prerequisite: Undergraduate degree in anthropology. If a student's bachelor's degree is not in anthropology, the student may be admitted provisionally while completing appropriate background course work.

Requirements for Degree

- I. Credit hours (33): Minimum 27 hours plus 6 thesis hours (Anthr 699R); a minimum of 20 under direct instruction of professional anthropologists at BYU or in another acceptable department. Thesis, reading, internship, and individual work do not count toward these 20 hours.
- II. Committee: Each student identifies two faculty members and obtains their consent to serve on his or her graduate committee. One of them will become chair of the student's advisory committee, and the other will serve on it. The committee and the student agree on a curriculum plan in accordance with the Graduate Program Description (available from the department).
- III. Required core courses: Anthr 505, 534; 550 or 551; 590, 605, 615, 699R.
- IV. Additional courses: 9 hours from Anthr 621–629, 672, 690R; electives.
- V. Thesis.
- VI. Examinations:
A. Written comprehensive examination at or near completion of required courses and before undertaking serious work on thesis.
B. Oral defense of thesis.

Anthropology Minor

A minor in anthropology can add a cross-cultural perspective, useful for people with international or multicultural interests in the following majors or fields of interest: nutrition, education (either elementary or secondary), educational leadership, counseling, international and area studies, psychology, social work, sociology, art, communications, theatre and film, language, business administration, public administration, applied economics, family sciences, marriage and family therapy, geography, or history.

Requirement: Minimum 15 hours. See department for specific requirements.

Program and Degree Resources

Charles Redd Center for Western Studies and Lemuel H. Redd, Jr., Chair in Western History
Joseph Fielding Smith Institute for Church History
Museum of Peoples and Cultures
New World Archaeological Foundation

Anthropology Graduate Courses

505. Anthropological Theory. (3)

Analysis of the development of anthropological theory and current issues in anthropological thought.

534. Social Anthropology. (3)

Political, economic, and social institutions in cultural systems. Emphasis is on issues.

537R. Communication and Culture. (3)

Course designed for higher-level work load while attending Anthr 309.

550. (Anthr-Ling) Sociolinguistics. (3)

Research and theory in anthropological linguistics and sociolinguistics.

551. (Anthr-Ling) Anthropological Linguistics. (3)

Language in culture and society: development, typology, and description.

590. Biological Anthropology. (3)

Issues in human genetics, diversity, and origins.

599. Federal Agency Internship. (1-6)

Earning credit while employed in federal agency archaeology. Agencies include the BLM and U.S. Forest Service.

605. Archaeological Method and Theory. (3)

Current theoretical and methodological trends and developments in archaeological research.

615. History of Archaeological Thought. (3)

Historical approach to the development of archaeological knowledge, method, and theory; emphases on North America and individual contribution.

621. Issues in Great Basin Prehistory. (3)

Overview of Great Basin prehistory. Primary researchers and an in-depth focus on current issues.

623. Issues in Historic Archaeology. (3)

In-depth review of issues, trends, and methods of historic archaeology.

- 625R. Issues in Mesoamerica Prehistory. (3)
Current issues in archaeological research in Mesoamerica.
627. Issues in Near Eastern Prehistory. (3)
Current issues in Near Eastern archaeological research.
629. Issues in Southwestern Prehistory. (3)
Current issues in archaeological research in the American Southwest.
- 655R. Field School Supervision. (2)
672. Special Scientific Techniques for Archaeology. (3)
Dating and analytical techniques using methods of chemistry, physics, etc.
- 690R. Seminar. (2-3)
Special topics in archaeology.
- 694R. Readings. (1-3)
Prerequisite: supervising instructor's consent.
Reading about 1,000 pages per credit hour and providing required products.
- 695R. Research. (1-3)
Prerequisite: supervising instructor's consent.
- 696R. Museum Projects. (1-3)
Prerequisite: supervising instructor's consent.
- 699R. Master's Thesis. (1-9)

Art

Chair: Robert L. Marshall, B-509 HFAC, 378-4429
Graduate Coordinators:
Art Education: Sherron D. Hill, C-502-C HFAC, 378-6003
Art History: Steven Bule, D-501-B HFAC, 378-2235
MFA Programs: W. Wayne Kimball, Jr., B-481-C HFAC, 378-3033

Faculty/Specialties

Professors

Barsch, Wulf E. (1974) MFA, Brigham Young University, 1972. Painting, Printmaking.
Christensen, James C. (1976) MA, Brigham Young University, 1968. Painting.
Day, Michael D. (1983) EdD, Stanford University, 1973. Art Education.
Kimball, W. Wayne, Jr. (1984) MFA, University of Arizona, 1970. Printmaking.
Marshall, Robert L. (1969) MA, Brigham Young University, 1968. Painting.
Myer, Peter L. (1972) MFA, University of Utah, 1959. Painting.

Associate Professors

Allen, Von D. (1984) MFA, Syracuse University, 1983. Ceramics.
Bule, Steven (1984) PhD, Ohio State University, 1987. Art History, Italian Renaissance.
Hadlock, Neil (1990) MFA, Brigham Young University, 1971. Sculpture.
Hamilton, Charles Mark (1974) PhD, Ohio State University, 1978. Architectural History.

Hill, Sherron D. (1981) PhD, University of Iowa, 1973. Art Education.
Johnson, Mark J. (1987) PhD, Princeton University, 1986. Art History, Roman/Early Christian.
Smith, Bruce H. (1977) MFA, University of Utah, 1968. Painting.

Assistant Professors

Beattie, Donna Kay (1989) PhD, University of Kansas, 1990. Art Education, Measurement and Evaluation.
Haltern, Hagen G. (1978) MFA, Kunstakademie, Dusseldorf, Germany, 1976. Painting.
Himes, Hal Douglas (1988) MFA, Brigham Young University, 1987. Printmaking.
Peacock, Martha (1987) PhD, Ohio State University, 1989. Art History, Northern Baroque.

Graduate Degrees and Programs

MA Art Education
MA Art History
MFA Studio Art

Areas of Specialization

MFA: Ceramics, Painting—Drawing, Printmaking—Drawing, Sculpture

Degree and Program Requirements

MA Art Education

The MA program in art education offers two options. Option A requires a research-oriented thesis, and Option B requires development of a practical curriculum project.

Option A is intended for individuals who plan to pursue a PhD or an EdD in art education. The required course work and thesis preparation will help develop research and writing skills that are necessary for students to compete in a doctoral program.

Option B is intended for individuals who teach art and desire professional and personal development that will improve their abilities to teach and make art. The required course work and curriculum project will help students develop understanding and skills for professional leadership in art education.

Admission and Entry

- I. Application requirements:
 - A. Financial consideration (tuition and assistantships) for academic year—March 1
 - B. Semesters of entry and application deadlines:
Fall —March 1 (U.S. and international)
Winter —September 1 (U.S. and international)
Spring —February 1 (U.S.)
Summer —April 1 (U.S.)
 - C. Slide portfolio of applicant's recent work.
 - D. One or two written papers demonstrating applicant's writing skills.
 - E. GPA: Minimum of 3.0 for last 60 hours.
- II. Prerequisite:
 - A. Baccalaureate degree in art education from an accredited institution. Applicants holding other teaching degrees may be considered if art deficiencies are completed to the satisfaction of the art education admissions committee.

- B. Certification to teach in public schools at the elementary or secondary level.
- C. Minimum two years of teaching experience.

Requirements for Degree

- I. Credit hours (Option A — 32; Option B — 36): Minimum 26–32 course work hours primarily from 500- and 600-level courses (no more than 9 hours of 300- and 400-level courses may apply), plus 6 thesis or 4 project hours (Art 699R or 698R).
- II. Select graduate advisory committee during first semester and submit study list.
- III. Course requirements for Option A:
 - A. 15 hours of core art education seminar.
 - B. 5 hours of education research and writing.
 - C. 6 elective hours (may include approved courses taken outside the department).
- IV. Course requirements for Option B:
 - A. 15 hours core art education seminar.
 - B. 9 hours divided among art studio and art history courses.
 - C. 6 elective hours (may include approved courses taken outside the department).
 - D. 2 hours of educational writing.
- V. Acceptance by department of thesis or curriculum project proposal.
- VI. Thesis or curriculum project.
 - A. 6 hours — Option A (thesis).
 - B. 4 hours — Option B (project).
- VII. Examinations:
 - A. Written comprehensive examination during final semester of residency.
 - B. Oral defense of thesis or project.

MA Art History

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
 - Fall —March 1 (U.S. and international)
 - Winter —June 1 (international)
 - September 1 (U.S.)
 - B. GPA: Minimum of 3.3 for last 60 hours.
- II. Prerequisite: Baccalaureate degree in art history or related field.

Requirements for Degree

- I. Credit hours:
 - A. Thesis option (30): Minimum 24 course work hours plus 6 thesis hours (Art 699R).
 - B. Two-paper option (33): Minimum 27 course work hours plus 6 hours of Art 698R.
- II. Select graduate advisory committee during first semester and submit study list.
- III. Required courses: Art 300; the MA program is designed to allow maximum exposure to the various areas of art history. Courses should be selected in consultation with the graduate coordinator and advisory committee chair.

- IV. Language requirement: Reading knowledge of at least one foreign language, preferably French or German; similar competence recommended in a second language.
- V. Thesis or two extended papers.
- VI. Examinations:
 - A. Final written comprehensive examination.
 - B. Oral defense of thesis.

Specific information on course and program requirements is available from the Department of Art.

MFA Art Studio

- Ceramics
- Painting—Drawing
- Printmaking—Drawing
- Sculpture

Admission and Entry

- I. Number of resident MFA candidates is restricted by availability of individual studio space.
- II. Application requirements:
 - A. Semesters of entry and application deadlines:
 - Fall —March 1 (U.S. and international)
 - Winter —June 1 (international)
 - September 1 (U.S.)
 - B. GPA: Minimum 3.0 for last 60 hours.
 - C. Complete university and department graduate application forms.
 - D. A 20-slide portfolio of applicant's work.
- III. Prerequisite: Baccalaureate degree in art or equivalent with a minimum of 20 hours of upper-division course work and 12 hours of art history.
- IV. Applicants with MA degree in art from another institution may request departmental approval to transfer graduate credit.

Requirements for Degree

- I. Credit hours (60): Minimum 60 hours of approved course work, including 6 hours of project (Art 697R).
- II. Course requirements:
 - A. 30 hours in area of specialization (ceramics, painting—drawing, printmaking—drawing, sculpture).
 - B. 9 hours in support area (may exceed departmental boundaries if approved by advisory committee); 3 must be in studio.
 - C. 12 hours of art history, criticism, and readings to include 3 hours of Art 598R; 3 hours of Art 512 or 516.
 - D. 1 hour of seminar (Art 595R) required during each semester in residence.
- III. Filing of study list (including selection of graduate advisory committee) during first semester.
- IV. Slide presentation of recent work (to studio faculty) at conclusion of each semester. A faculty rating of satisfactory, marginal, or unsatisfactory is used to determine progress and continuation in the program. Three semester ratings lower than satisfactory, two unsatisfactory ratings, or a marginal rating followed by an unsatisfactory rating will result in dismissal from the program.

- V. Preliminary exhibition and review for candidacy. At the end of the semester in which all course work except Art 697R (MFA project) is completed, the student is required to: (1) install, for approval, a preliminary exhibition; (2) have an examination to determine competency in course work; (3) submit a written proposal for his or her final project. Successful completion of the above advances the student to candidacy, wherein he or she is authorized to execute the final MFA project.
- VI. Final project and formal written project report. The final project must be produced and exhibited while enrolled in Art 697R (MFA project). Exhibitions and written reports of final projects of all MFA candidates are required and will be held by the department at a designated time each year (usually in March).
- VII. Examination: Oral defense of project and written project report.

Art Education Graduate Courses

578R. Art Education Studio. (3)

Includes MA courses in ceramics, drawing, figure drawing, oil painting, aqueous painting, printmaking, crafts, sculpture.

678R. Art Education Seminar: Issues and Trends. (3)

Seminar topics emphasizing issues and trends in art education. Topics investigated, discussed, and evaluated, depending on student needs.

698R. MA Curriculum Project. (1-4)

699R. Master's Thesis. (1-6)

Art History Graduate Courses

501. Art of Egypt and Mesopotamia. (3)

Social, political, and religious conditions that produced and found expression in the art of Egypt and Mesopotamia.

502. Greek Art. (3)

Consideration of formative cultures.

503. Roman Art. (3)

Art and architecture of the Etruscans and Romans.

504. Early Christian and Byzantine Art. (3)

Survey of Christian Art in the Roman and Byzantine Empire from CA 200 to 1453.

506. Italian Renaissance. (3)

Major artists, monuments, and influences of the Renaissance.

507. Northern Renaissance Art. (3)

Fifteenth- and sixteenth-century art in Northern Europe.

509. Nineteenth-Century European Art. (3)

History of nineteenth-century art in Europe and America.

510. Western Architecture. (3)

Critical evaluation of major movements in Western architecture.

511. Modern Architecture. (3)

Critical review of the roots and evolution of modern architecture.

512. Contemporary Art. (3)

Critical evaluation of trends in art since 1945.

513. Northern Baroque Art. (3)

Baroque painting in Flanders and Holland.

514. Southern Baroque Art. (3)

History of baroque painting, sculpture, and architecture in Italy, Spain, and France.

515. American Architecture and City Planning. (3)

Critical evaluation of American architecture and city planning; emphasizes sources.

516. Modern Art. (3)

Modern European art and theory, 1900–1945.

517. American Art. (3)

American painting and sculpture from colonial through modern times.

518. Early Medieval and Islamic Art. (3)

Art and architecture of Western Europe and Islamic lands from A.D. 500 to 1050.

519. Romanesque and Gothic Art and Architecture. (3)

Major monuments in architecture, sculpture, and painting from the Romanesque and Gothic periods.

520. Museology 1. (3)

Prerequisite: Art 211, 212.

Theoretical and administrative aspects of museum work.

521. Museology 2. (3)

Prerequisite: Art 520.

Functional aspects of museum work.

530. Teaching Art History in the Public Schools. (3)

Conceptual methodology of teaching art history in the public schools.

600R. Individual Study in Art History. (1-8)

Prerequisite: Art 211, 212, 298.

In-depth study into any chosen art historical era.

695R. Art History Seminar. (3)

699R. Master's Thesis. (1-6)

Art Studio Graduate Courses

540. Business Practices for Artists. (2)

594R. Special Problems. (1-6)

Prerequisite: graduate students only; instructor's and department's consent.

595R. Seminar. (1)

Student and faculty analysis of curriculum relationships, projection of student objectives, contemporary topics, and visits to current exhibits.

598R. Readings. (1-3)

Graduate readings in the visual arts.

621R. Graduate Drawing Studio. (1-8)

Prerequisite: admission to graduate program.

- 622R. Graduate Figure Drawing Studio. (1-8)
Prerequisite: Art 621R.
- 627R. Graduate Painting Studio. (1-8)
- 650R. Graduate Printmaking Studio. (1-8)
- 656R. Graduate Sculpture Studio. (1-8)
- 659R. Graduate Ceramics Studio. (1-8)
- 697R. MFA Project. (1-6)

Asian and Near Eastern Languages

Chair: Van C. Gessel, 4052-A JKHB, 378-6402
Graduate Coordinator: Dana S. Bourgerie, 4064 JKHB,
378-4952

Faculty/Specialties

Professors

- Kim, Han Kon (1990) PhD, Seoul National University, Korea, 1975. Korean Linguistics, Natural Language Processing and Computer-assisted Language Learning.
- Parkinson, Dilworth B. (1980) PhD, University of Michigan, 1982. Sociolinguistics, Computer-assisted Instruction, Arabic.
- Ricks, Stephen David (1981) PhD, University of California, Berkeley, 1982. Hebrew, Near Eastern Languages, History of Religions.

Associate Professors

- Gessel, Van C. (1990) PhD, Columbia University, 1979. Japanese Language and Literature.
- Honey, David B. (1987) PhD, University of California, Berkeley, 1988. Classical Chinese Language, Literature, and History.
- Russell, Robert A. (1982) PhD, Harvard University, 1977. Second Language Acquisition, Computer-assisted Instruction, Natural Language Processing, Japanese.
- Watabe, Masakazu (1977) PhD, University of Southern California, 1978. Linguistics, Japanese.
- Williams, Gary S. (1966) PhD, University of Washington, 1973. Chinese Language and Literature.

Assistant Professors

- Beaman, Bruce W. (1970) MA, Indiana University, Bloomington, 1969. Japanese Language and Literature.
- Belnap, R. Kirk (1990) PhD, University of Pennsylvania, 1991. Arabic Language and Linguistics.
- Bourgerie, Dana S. (1991) PhD, Ohio State University, 1990. Chinese Linguistics: Dialect Studies and Sociolinguistics.
- Perkins, George W. (1975) PhD, Stanford University, 1977. Classical Japanese Language and Literature.
- Peterson, Daniel C. (1986) PhD, University of California, Los Angeles, 1990. Medieval Islamic Philosophy, Arabic Language and Literature.
- Peterson, Mark A. (1983) PhD, Harvard University, 1987. Korean Language and History.

Graduate Degree and Program

MA Language Acquisition (Arabic, Chinese, Japanese, or Korean)

Degree and Program Requirements

MA Language Acquisition (Arabic, Chinese, Japanese, or Korean)

See Language Acquisition section of this catalog.

Asian and Near Eastern Graduate Courses

Chinese (Mandarin) Graduate Courses

599R. Cooperative Education: Internship. (9)
Prerequisite: Chin 301.
On-the-job cultural and/or language experience.

670R. Tutorial Internship in Chinese. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Chinese literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Chinese. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Chinese literature and language.

690R. Seminar in Chinese. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Chinese literature and language.

699R. Master's Thesis. (1-6)

Japanese Graduate Courses

599R. Cooperative Education: Internship. (9)
Prerequisite: Japan 301.

On-the-job cultural and/or language experience.

670R. Tutorial Internship in Japanese. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Japanese literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Japanese. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Japanese literature and language.

690R. Seminar in Japanese. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Japanese literature and language.

699R. Master's Thesis. (1-6)

Korean Graduate Courses

599R. Cooperative Education: Internship. (9)
Prerequisite: coordinator's consent and department.

On-the-job cultural and/or language experience. Students must meet departmental requirements and consult coordinator before enrollment. Report required.

670R. Tutorial Internship in Korean. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Korean literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Korean. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Korean literature and language.

690R. Seminar in Korean. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Korean literature and language.

699R. Master's Thesis. (1-6)

Near Eastern Languages and Literature

Ancient: Akkadian, Aramaic, Coptic, Egyptian, Hittite, Sumerian, Syriac, and Ugaritic Courses

511R. Studies in Ancient Near Eastern Languages. (2-4) On dem.

Grammar and reading skills.

521R. Special Topics in Ancient Near Eastern Literature. (2-3) On dem.

Historical and comparative studies of ancient Near Eastern literature.

Arabic Graduate Courses

531R. Advanced Topics in Arabic. (3) On dem.

Prerequisite: instructor's consent.

Advanced studies in Arabic language and literature.

670R. Tutorial Internship in Arabic. (1-3) On dem.

Individual research in cooperation with graduate faculty member in problems relating to Arabic literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Arabic. (1-3) On dem.

Individual study supervised by graduate faculty member in varying topics of specific interest in Arabic literature and language.

690R. Seminar in Arabic. (1-3) On dem.

Group studies supervised by graduate faculty member in varying topics of specific interest in Arabic literature and language.

699R. Master's Thesis. (1-6) On dem.

Hebrew Graduate Course

531R. Studies in Hebrew. (1-3)

Prerequisite: Heb 331.

Botany and Range Science

Chair: Wilford M. Hess, 401 WIDB, 378-2582

Graduate Coordinator: Kimball T. Harper, 489 WIDB, 378-2129

Faculty/Specialties

Professors

Andersen, William R. (1966) PhD, University of California, Davis, 1963. Plant Physiological Genetics.
Brotherson, Jack D. (1969) PhD, Iowa State University of Science and Technology, 1969. Community Ecology, Range Management.

Cates, Rex G. (1985) PhD, University of Washington, 1971. Plant/Herbivore Interactions, Ecological Chemistry, Ecosystem Processes.

Cox, Paul Alan (1983) PhD, Harvard University, 1981. Plant Evolutionary Ecology, Tropical Ecology, Ethnobotany.

Flinders, Jerran T. (1976) PhD, Colorado State University, 1971. Wildlife Behavior and Wildlife Habitat.

Harper, Kimball T. (1973) PhD, University of Wisconsin, Madison, 1963. Community Ecology, Plant Reproductive Biology.

Hess, Wilford M. (1962) PhD, Oregon State University, 1962. Ultrastructure, Plant Pathology.

Rushforth, Samuel R. (1970) PhD, Brigham Young University, 1970. Algology (especially diatoms), Evolutionary Morphology, Conservation Biology.

Smith, Bruce N. (1974) PhD, University of Washington, 1964. Plant Physiology, Photosynthesis, Growth.

Tidwell, William D. (1966) PhD, Michigan State University, 1966. Paleobotany, Anatomy and Morphology.

Valentine, John F. (1968) PhD, Texas A&M University, 1959. Grazing Management, Ranch Management and Development.

Weber, Darrell Jack (1969) PhD, University of California, Davis, 1963. Plant Biochemistry and Pathology.

Welsh, Stanley L. (1960) PhD, Iowa State University of Science and Technology, 1960. Plant Systematics.

Associate Professor

St. Clair, Larry Lee (1976) PhD, University of Colorado, 1984. Lichen Ecology.

Assistant Professors

Anderson, Val Jo (1989) PhD, Texas A&M University, 1989. Range Ecology, Ecophysiology.

Fairbanks, Daniel J. (1988) PhD, University of Arizona, 1988. Genetics, Molecular Biology, Biotechnology

Graduate Degrees and Programs

MS Biological Science Education

MS, PhD Botany

MS, PhD Molecular Biology (Interdepartmental Program)

MS Range Science

MS, PhD Wildlife and Range Resources

Areas of Specialization

MS: Biological Science Education, Biotechnology, Botany, Conservation Biology, Genetics, Natural Resource Development, Range Science, Wildlife and Range Resources

PhD: Biotechnology, Botany, Genetics, Wildlife and Range Resources

Degree and Program Requirements*

MS Biological Science Education

MS Botany

MS Molecular Biology (Interdepartmental Program)

MS Range Science

MS Wildlife and Range Resources

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 20 (U.S. and international)
Winter —June 30 (U.S. and international)
- B. Entrance examinations:
 - 1. GRE General Test and advanced biology subject test.
 - 2. Oral diagnostic examination.
 - 3. Foreign students must submit TOEFL scores.

II. Prerequisite:

- A. Baccalaureate degree in botany or equivalent for biological science education or botany program applicants.
- B. Baccalaureate degree in molecular biology or biological or physical science for molecular biology program applicants. This would include one year of general university physics, mathematics equivalent to Math 113, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-McBio-Zool 341 and 342.
- C. Baccalaureate degree in range, wildlife, or equivalent for range science or wildlife and range resources program applicants.

Requirements for Degree

- I. Credit hours (30): Minimum 24 approved course work hours plus 6 project (Botny 698R) or 6 thesis hours (Botny 699R or Range 699R). Molecular biology includes additional specific requirements (see V below).
- II. Required course: Botny 691R or Range 691R (each semester of residence).
- III. Thesis or project: Standard university thesis format or journal publication format is required for thesis. Project format must satisfy committee requirements.
- IV. Examinations:
 - A. Defense of research design.
 - B. Oral examination on course work.
 - C. Oral defense of thesis or project.
- V. Minimum requirements for molecular biology include Chem 367, 481, 582, 586; Stat 337 or 501; McBio 401, 425, 441, 442, and 642 or Zool 526.

PhD Botany

PhD Molecular Biology

PhD Wildlife and Range Resources

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 20 (U.S. and international)
Winter —June 30 (U.S. and international)
- B. Entrance examinations:
 - 1. GRE General Test and GRE advanced biology subject test.
 - 2. Oral diagnostic examination.
 - 3. Foreign students must submit TOEFL scores.
- II. Prerequisite: Master's degree in field or equivalent.

Requirements for Degree

- I. Credit hours (42): Minimum 24 hours course work plus 18 hours of dissertation (Botny 799R or Range 799R). Note: Individuals with an MS at BYU who wish to obtain a PhD here must go elsewhere for one year (30 semester hours).
- II. Required course: Botny 691R or Range 691R (each semester of residence).
- III. Skill requirement: Includes 21 hours in skill subject area of foreign languages, mathematics, statistics, geography, and/or computer science. Consult graduate coordinator for details.
- IV. Dissertation: Standard university dissertation format or journal publication format.
- V. Examinations:
 - A. Defense of research design.
 - B. Comprehensive written and oral examinations on completion of skill requirement and course work.
 - C. Oral defense of dissertation.

*All degree options: Obtain a copy of the Graduate Student Handbook from the department office (401 WIDB).

Program and Degree Resources

Benson Institute

BYU Agriculture Station

Electron Optics Laboratory

Greenhouses and growth chambers

Harrison Arboretum

Lytle Ranch

M. L. Bean Life Science Museum

USFS Shrub Sciences Laboratory

Botany Graduate Courses

500. (Botny-Range) Chemical and Physiological Ecology. (3) F on dem.

Prerequisite: Biol. 130, Botny 350 (or equivalents), or instructor's consent.

Secondary metabolites and their role in population, community, and ecosystem phenomena.

510. Advanced Taxonomy. (3) F on dem.

Prerequisite: Botny 210 or instructor's consent.

Review of taxonomic literature and of research methods. One three-day field trip arranged.

515. (Botny-Range) Agrostology: Taxonomy and Ecology of Grasses. (3) W even year

Prerequisite: Botny 210.

Classification and ecology of grasses, emphasizing important forage species.

520. Ethnobotany. (3) W on dem.

Prerequisite: Botny 120.

Use of plants by diverse human cultures. Integration of current anthropological and botanical literature, emphasizing ethnotaxonomies, survival strategies, and ethnomedicine.

521. Ethnobotany Practicum. (1-5) On dem.

Prerequisite: Botny 520.

Ethnobotanical research. May require field trip outside continental U.S. Emphasizes participant observation, interviewing techniques, documentary video and film, botanical collecting techniques, and chemical extraction.

522. Biological Instrumentation. (2) W even year

Prerequisite: graduate status or instructor's consent.

Theory and application of research instruments to biological problems.

523. Biological Instrumentation Laboratory. (2) W even year

Prerequisite: Botny 522 or concurrent registration.

Operating research instruments.

526. (Botny-Zool) Cell Biology. (3) F on dem.

Prerequisite: introductory course in biochemistry.

Molecular physiology and ultrastructure of cells, emphasizing eukaryotic organisms.

527. (Botny-Range) Wildland Shrubs. (3) Sp even year

Taxonomy and ecology of wildland shrubs. Field trip required.

530. Scanning Electron Optics. (3) F, W

Prerequisite: instructor's consent.

Scanning electron microscopy of biological, physical science, and engineering samples, emphasizing practical applications.

531. Transmission Electron Optics. (3) F, W on dem.

Prerequisite: instructor's consent.

Transmission electron microscopy of biological, physical science, and engineering samples, emphasizing practical applications.

534. Lichenology. (3) On dem.

Detailed study of lichens, including classification, morphology, and ecology. Field trip required.

539. Paleobotany. (3) On dem.

Prerequisite: Botny 105, Geol 103.

Morphology and relationships of fossil plants.

540R. Advanced Topics in Plant Physiology. (3) W on dem.

Prerequisite: Botny 440 or instructor's consent.

550. Plant Geography. (3) W on dem.

Distribution of plant species and communities in the light of present and past climates.

551. (Botny-Range) Quantitative Ecology. (3) W even yr.

Prerequisite: Botny-Zool 350 or equivalent; Stat 222 or 501.

Methods of community analysis.

552. (Botny-Range) Terrestrial and Rangeland Ecosystems. (4) F even yr.

Prerequisite: Botny-Zool 350 or equivalent, Stat 222 or 501.

Biotic communities of the earth; population dynamics; reproductive, life-form, and longevity patterns; species interactions; structure, dynamics, and evolution of communities.

554. Population and Conservation Biology. (3) F even yr.

Prerequisite: Botny-Zool 350 or equivalent.

Analysis of populations in natural settings; theoretical and practical strategies for conservation of endangered biota and preservation of biodiversity.

559. (Botny-AgHrt) Plant Breeding. (2) W even yr.

Prerequisite: AgHrt 459 or equivalent, Botny 341.

Genetics and methods of plant breeding related to improving agronomic and horticultural crops.

574. (Botny-AnSc) Introduction to Population Genetics. (3) F odd yr.

Prerequisite: introductory course in genetics and in statistics.

Quantitative study of factors influencing changes in gene frequencies in natural and domestic animal and plant populations.

610. Botanical Terminology and Nomenclature. (2) On dem.

Prerequisite: instructor's consent.

Botanical terminology, including the contributions of Latin and Greek words, their gender, number, and case.

630. Angiosperm Morphology. (4) On dem.

Prerequisite: familiarity with taxonomy, anatomy, and physiology or biochemistry.

Structures, relationships, and evolution of flowering plants.

650R. Advanced Plant Ecology. (2) On dem.

Current trends in ecological research and philosophy.

678. Organic Evolution. (3) On dem.

Prerequisite: introductory course in genetics or instructor's consent.

691R. Graduate Seminar. (1) F, W

697R. Special Problems. (1-6) F, W, Sp, Su

698R. Master's Project. (1-6) F, W, Sp, Su on dem.

699R. Master's Thesis. (1-9) F, W, Sp, Su

799R. Doctoral Dissertation. (1-9) F, W, Sp, Su

Range Science Graduate Courses

500. (Range-Botny) Chemical and Physiological Ecology. (3) F on dem.

Prerequisite: Biol 130, Range-Zool 354 (or equivalents), or instructor's consent.

Secondary metabolites and their role in population, community, and ecosystem phenomena.

505. Wildlife Law Enforcement. (3) W

Prerequisite: Biol 130 or equivalent.

Current and historical principles of federal and state wildlife law enforcement, case development, evidence, evaluation, human rights, and testimony.

508. Physiological Plant Ecology. (3) On dem.

Influence of environmental parameters on plant growth and function, including plant morphological and physiological adaptations.

515. (Range-Botny) Agrostology: Taxonomy and Ecology of Grasses. (3) W even yr.

Prerequisite: Botny 210.

Classification and ecology of grasses, emphasizing important forage species.

527. (Range-Botny) Wildland Shrubs. (3) Sp even yr.

Taxonomy and ecology of wildland shrubs. Field trip required.

551. (Range-Botny) Quantitative Ecology. (3) W even yr.

Prerequisite: Range-Zool 354 or equivalent, Stat 222 or 501.

Methods of community analysis.

552. (Range-Botny) Terrestrial and Rangeland Ecosystems. (4) F even yr.

Prerequisite: Range-Zool 354 or equivalent, Stat 222 or 501.

Biotic communities of the earth; population dynamics; reproductive, life-form, and longevity patterns; species interactions; structure, dynamics, and evolution of communities.

561. Watershed Management. (3) F even yr.

Prerequisite: Range-Zool 354 or equivalent.

Water-producing characteristics of forest and rangelands, emphasizing laboratory and field studies of soil and vegetation.

565. Wildlife Behavioral Ecology. (3) W even yr.

Prerequisite: Biol 130, Range-Zool 354 (or equivalents).

Integration of the principles of ethology, sociobiology, and behavioral ecology using examples from wildlife and livestock. Behavioral sampling methods stressed. Field trip required.

691R. Graduate Seminar. (1) F, W**697R. Special Problems.** (1-6) F, W, Sp, Su

Advanced study of selected range topics: fire ecology, grazing systems, wetlands and wildlife, ecology, evolutionary biology, plant herbivore interactions, and wildlife behavioral ecology.

699R. Master's Thesis. (1-9) F, W, Sp, Su**799R. Doctoral Dissertation.** (1-9) F, W, Sp, Su**Business Administration**

Master of Business Administration Program Director:

Gary F. McKinnon, 640 TNRB, 378-3500

Faculty/Specialties**Professors**

Adolphson, Donald L. (1980) PhD, University of Wisconsin, Madison, 1973. Operations.

Andrus, Roman R. (1976) PhD, Columbia University, 1965. Marketing.

Barnes, Howard W. (1964) MBA, University of Southern California, 1963; Dr. rer. pol., Technical University of Brunswick, FRG, 1968. Marketing/International Business.

Bryson, Phillip J. (1988) PhD, Ohio State University, 1967. Economics.

Call, Ivan T. (1963) DBA, Indiana University, Bloomington, 1969. Financial Management, Management of Financial Institutions.

Daines, Robert H. (1959) DBA, Indiana University, 1966. Finance.

Geurts, Michael D. (1975) PhD, University of Oregon, 1972. Sales Forecasting, Marketing Research.

Giaquque, William C. (1977) DBA, Harvard University, 1972. Quantitative Business Analysis.

Hill, Ned C. (1987) PhD, Cornell University, 1976. Finance.

Hunt, H. Keith (1975) PhD, Northwestern University, 1972. Marketing.

McKinnon, Gary F. (1969) PhD, University of Texas, Austin, 1968. Marketing.

Pinagar, J. Michael (1988) PhD, University of Utah, 1982. Finance.

Schill, Ronald L. (1971) PhD, University of Oregon, 1971. Industrial Marketing/Procurement, Sales Management.

Smith, Milton E. (1966) PhD, University of Utah, 1981. Management of Financial Institutions, Insurance.

Smith, Scott M. (1981) PhD, Pennsylvania State University, 1979. Marketing.

Stone, Bernell K. (1986) PhD, Massachusetts Institute of Technology, 1968. Finance.

Swinyard, William R. (1978) PhD, Stanford University, 1976. Marketing, Consumer Behavior.

Associate Professors

Cox, Charles M. (1965) PhD, University of Washington, 1978. Corporate Finance.

Hartman, Larry D. (1984) EdD, Oklahoma State University, 1973. Communication.

Heaton, Hal B. (1982) PhD, Stanford University, 1983. Finance.

Jackson, W. Burke (1973) PhD, Stanford University, 1978. Operations Management and Manufacturing Strategy.

Lambert, William R. (1962) DBA, Indiana University, Bloomington, 1968. Investments.

Lee, Terry Nels (1970) PhD, University of Washington, 1973. Production, Quantitative Methods.

Nelson, R. D. (1981) PhD, University of California, Berkeley, 1975. Managerial Economics.

Plenert, Gerhard J. (1990) PhD, Colorado School of Mines, 1987. Operations.

Rinne, Heikki (1984) PhD, Purdue University, 1981.
Marketing.
Sawayra, William J., Jr. (1978) PhD, Arizona State
University, 1971. Operations Management.
Wilson, Brent D. (1979) DBA, Harvard University, 1969.
International Business.

Assistant Professors

Beck, John Christen (1989) PhD, Harvard University,
1989. Policy, Organizational Behavior.
Hanson, Kaye (1989) PhD, Brigham Young University,
1983. Communication.
McQueen, Grant R. (1989) PhD, University of
Washington, 1989. Finance.
Swenson, Michael J. (1989) PhD, University of Oregon,
1980. Marketing.
Thompson, Michael P. (1988) PhD, Rensselaer
Polytechnic Institute, 1985.
Thorley, Steven R. (1991) PhD, University of Washington,
1991. Finance.
Whitlark, David B. (1989) PhD, University of Virginia,
1988. Marketing, Operations.

Graduate Degree and Program

MBA - Business Administration

Program Information

The Master of Business Administration Program is a two-year program designed to prepare the graduate student for a career in business. Currently the program presents a new and exciting approach to teaching business management. Courses are integrated across disciplines in order to use faculty expertise from different points of view. Concept days are alternated with case study days to improve practical application.

During the first year, concepts are taught in the following subjects: finance, marketing, operations, organizational behavior, communication, accounting, managerial economics, and management strategy. During the second year students select elective courses that emphasize their interests. Increasingly, international focus and entrepreneurship are encouraged to better prepare the student for the world of business.

The curriculum has been designed to achieve the two-fold task of giving the student (1) a general management education and (2) depth in area(s) bearing specifically on personal professional interests.

Students who complete the program will have (1) acquired an understanding of business and management tools and principles that have enduring significance in a changing environment, (2) developed advanced knowledge in a field of concentration in the area of the student's major interest, (3) achieved an understanding of the utilization of quantitative methods and behavioral sciences in the solution of business problems, (4) obtained skills in critical analysis and careful reasoning, and (5) strengthened their ability to communicate effectively.

MBA Business Administration

MBA classes are generally not available to students other than those in the following programs: master of business administration, juris doctor/master of business administra-

tion, master of business administration/master of accountancy, master of business administration/master of arts in international and area studies, or master of organizational behavior. All first-year MBA classes are required for graduation.

Graduate students from other colleges can add MBA classes on the following bases:

- To add a first-year MBA class (500 series), students are required to submit a formal request to the MBA Policy Committee for approval. Students should understand that first-year classes are not generally available to non-MBA students.
- MBA second-year classes (600 series) can be added with the consent of the professor teaching the course.
- All MBA classes must be added by using an add/drop card and obtaining a signature from the MBA Office, 640 TNRB.

MBA Executive Option

The Executive Master of Business Administration option is a rigorous program in general management for fully employed professionals. Designed for managers and professionals who typically have from three to four years of full-time managerial work experience, it consists of courses similar to the full-time MBA Program but is unique in reflecting the work and management experience of its students.

Obtaining an MBA degree through the Executive MBA option requires a year-round commitment for two years. Class sessions are generally held two evenings each week and occasionally on Saturdays. Students spend one residency week on campus each year in a complex case analysis and other concentrated study. Executive MBA classes are generally not available to students in other programs. Special requests should be made to the Executive MBA Policy Committee, c/o the Executive MBA Office.

For details concerning admission requirements and application dates, refer to the Marriott School of Management Graduate Catalog or consult the Executive MBA Office, 637 TNRB, 378-3622.

Joint Programs with Other Disciplines

The university has approved two programs whereby qualified students may obtain both the MBA and another graduate degree during a specified period of time by meeting certain requirements:

Joint JD/MBA Program in law and business administration

Joint MBA/MA Program in business administration and international and area studies

Inquiries about any of these programs should be directed to the MBA Office. No joint degrees are available in combination with the Executive MBA option.

Degree and Program Requirements

MBA Business Administration

See the Marriott School of Management Graduate Catalog for details regarding this program.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—May 15 (U.S.)
 - B. Entrance examination: GMAT.
 - C. GPA: Minimum 3.0 on 4.0 scale.
- II. Prerequisite:
 - A. Baccalaureate degree from an accredited institution.
 - B. Background in college algebra and a basic course in computer programming. Recommended: Background in accounting, calculus, economics, and statistics.
 - C. In addition to the above, the Executive MBA option requires a minimum of three years full-time managerial experience.

Requirements for Degree

- I. Required courses:
 - A. First-year program: Courses in financial management, marketing management, operations management, managerial economics, macroeconomics and the business environment, business and government, managerial accounting, quantitative methods, computers and management, organizational behavior, written and oral communication, and management simulation.
 - B. Second-year program: Courses in business policy, and business and society.
- II. Electives: See MBA or Executive MBA Policies and Procedures publications.
- III. Emphases: Entrepreneurship, corporate finance, investment management, management of financial institutions, marketing research and analysis, marketing management, management information systems, organizational behavior, strategic management, production and operations management, quantitative methods.
- IV. Consult Marriott School of Management Graduate Catalog for additional requirements.

Master of Business Administration Courses

Required Courses:

97R. Computer Skills for Managers. (0)

A two-week review of computer skills, offered before the first semester for those without adequate background. Fee.

500. Corporate Financial Reporting. (2.5)

A study of published corporate financial statements to aid in analysis of a wide variety of financial reporting issues.

510. Managerial Economics. (2.5)

Application of specific microeconomic principles to business operations in a market economy.

511. Macroeconomics and Business Environment. (2)

The study of aggregate economic fluctuations and their impact on business decisions.

520. Business Finance 1. (2.5)

A study of the short-term financing of a business operation. Development of techniques for financial planning, such as analysis of ratios, profitability, and liquidity.

530. Statistical Analysis. (2.5)

Introduction to applied business statistics, emphasizing hypothesis-testing techniques and simple and multiple correlation and regression.

533. Operations Management 1. (2)

Strategic positioning, planning, coordination, and physical processes of delivering services or manufacturing products. Included are such topics as product and process design, inventory planning and control, quality assurance, and work force motivation, incentives, and control.

540. Organizational Behavior. (2.5)

Analysis of individual, group, and organization variables that inhibit or facilitate effective organizational functioning. Topics include motivation, rewards, leadership, conflict, decision making, structure, evaluation, and change.

550. Marketing Management 1. (2)

Development of analytical marketing tools and techniques; their utilization in case analysis and decision making in marketing management.

560R. Integrative Exercise. (5-1)

Integrated applications of case analysis and presentation skills. Students work as groups to analyze cases and formulate recommendations, then make professional presentations to groups representing management.

561. Written and Oral Communication 1. (2)

Examination of most frequent business communication techniques. Learning accepted business correspondence and report-writing concepts and developing skills that contribute to effectiveness in oral and written situations in business.

562. Written and Oral Communication 2. (1.5)

A continuation of Written and Oral Communication 1. Analysis of oral communication techniques in practice and limited theory. Several experiences presenting orally before video cameras with expert feedback. Practice presenting orally before peers. Supervised goal setting and self-improvement in written and oral communications situations.

580. Introduction to Strategy. (2)

Introduction to strategic planning; concepts, models, and analysis.

585. Management and Technology. (2.5)

Management and control with information technology. A study of information flow, database design, and use applied to cost controls and managerial decision making.

591. Business, Government, and International Economy. (3)

Holistically analyzes environment in which corporations exist and operate: the changing economic, political, and social forces and the institutions and policies through which different communities influence the activities of business.

593R. Management Seminar. (1)

Invited guests speak on topics of general management interest ranging from ethics, industry problems and opportunities, and government policies to relevant current events.

680. Business Policy. (3)

A top-management approach to the problems of determining corporate strategy.

682. Ethics, Business, and Society. (3)

The heart of ethics is responsibility. This course examines the nature of personal and corporate responsibility from the perspective of the global system in which we all live.

An analysis of the forces operating business firms and those created by business firms, such as individual ethics, labor relations, urban affairs, race and sex discrimination, and government relations.

Electives:

586 (MBA-ISys 548). Data Communication. (3)

Prerequisite: admission to MSM graduate program.

Principles of data communications, local and wide area networks, hardware, software, media, standards, application, implementation, and management.

601. Managerial Accounting 2. (3)

A continuation of Managerial Accounting 1, with particular emphasis on process costing systems and on current costing issues, problems, and applications. The course requires completion of an approved project.

602. Federal Income Taxation. (3)

Analysis to heighten awareness of tax considerations on business decisions. Business transactions are analyzed for their tax factors. A study is made on the basic structure of the law and the implications of both personal and corporate income tax.

603 (MBA-ISys 643). Advanced Information Systems Analysis. (3)

Prerequisite: Admission to MSM graduate program.

Advanced systems analysis and design, emphasizing information requirements, input/output analysis, and procedure documentation.

604 (MBA-ISys 644). Advanced Information Systems Design. (3)

Prerequisite: ISys 643

Advanced concepts and techniques of systems analysis and design, emphasizing systems development, systems tools, prototyping, and related topics.

605 (MBA-ISys 645). Advanced Database Analysis and Design. (3)

Advanced database organization, emphasizing conceptual and logical design, semantic modeling, database integrity, and security.

606. Seminar in Current Accounting Problems. (3)

A study of current accounting thought and issues. The course content and format will vary from year to year in accordance with interests of the instructor and students.

607 (MBA-ISys 657). Management Consulting and Projects. (3)

Application of technical knowledge in the role of a consultant to management. Includes preparation of proposals, conducting an engagement, reporting results, and recommending change.

608 (MBA-ISys 646). Advanced Fourth-Generation Programming Languages. (3)

Advanced skills development in programming languages, emphasizing fourth-generation languages.

610 (MBA-ManEc). Consulting Applications of Economic Analysis. (3)

The application of economics, including dynamic modeling, to the problems of managing business transactions.

611 (MBA-ManEc). National and International Business Environment. (3)

Prerequisite: MBA 610.

Presentation of the macroeconomy at an intermediate level, with special attention to the government and international trade sectors.

613 (MBA-ManEc). Business and Economic Forecasting: Theory and application. (3)

An investigation of forecasting methodologies with an emphasis on time series analysis. Practical applications are stressed.

614 (MBA-ManEc). Market Analysis and Decision Making. (3)

A course in the use of marketing research, economic theory, and statistics in managerial decision making. The focus is on understanding the role of the manager in working with technical specialists to improve business planning.

615R (MBA-ManEc). Seminar in Managerial Economics. (3)

Preparing and presenting economic analysis to line managers.

618. Personal Financial Planning. (3)

An examination of financial decision making by the household. Applications include income tax, retirement and estate planning, investment strategy, portfolio management, and personal risk management. Instances where business interests affect personal finances are also included.

620. Corporate Financial Strategy. (3)

A selection of important problems surrounding the issues of financial strategy and tactics confronting top financial and general managers.

621. Advanced Corporate Finance. (3)

Covers advanced corporate finance issues such as mergers/acquisitions, valuation, financial restructurings, leveraged buyouts, capital structure, international portfolio analysis, tax-driven decisions, leasing, recapitalizations, industry restructurings, and others as time permits.

622. Investments. (3)

A comprehensive study of the basic principles and techniques of investment analysis and portfolio selection and management. Portfolio policies available to investors are critically appraised.

623. Investment Theory and Evidence. (3)

A review of modern investment theory and evidence including asset pricing models, options pricing, the efficient markets hypothesis, portfolio diversification, and performance measures.

624. Capital and Security Markets. (3)

An examination of the functions and instruments of the capital markets: relationships to the money markets, historical background, structures, and analysis of significant economic problems and trends in the markets.

625. Management of Financial Institutions. (3)

Examination of problems and policies of financial institutions. Topical areas include competition for funds, asset liability management, capital management, strategic diversification, and shaping of competitive strategy.

626. Short-Term Financial Management. (3)

An overview of the treasurer's function: cash, liquidity, payables and receivables management; short-term borrowing, electronic data interchange, bank service products, international transactions, and forecasting.

627. International Finance. (3)

An examination of the impact that currency, tax, and capital market variations between countries have on the sourcing of funds, the management of working capital, the investment of funds, and the protection of assets. Emphasis is placed on understanding the foreign exchange market.

628. Futures and Options Markets. (3)

An examination of futures markets (with a primary orientation toward commodity speculation) and the theory of options pricing; an in-depth look at the formation and use of options pricing techniques; and a review of investment strategies using options.

629. Silver Fund. (3)

Team management of actual investment portfolios for a full year. Responsibility for economic forecasts, security selection, and portfolio strategy. Students apply for a position of management in the spring for the following year. Selections for participation made by faculty committee.

630. Managers Quantitative Tool Kit 1. (3)

Development of computer-augmented practical skills available to today's managers. Modules include modeling, simulation, optimization, survey statistics, forecasting, econometrics, and graphic presentation.

631. Advanced Data Analysis. (3)

Use of standard methods of statistical estimation and inference in analyzing empirical and experimental data. Topics considered include introduction to experimental design, analysis of variance and covariance, factor analysis, multiple regression, and discriminant analysis.

632. Managers Quantitative Tool Kit 2. (3)

A continuation of Managers Quantitative Tool Kit 1.

633. Operations Management 2. (3)

Completion of operations fundamentals begun in MBA 533. Production and associated management systems that exist in business enterprises.

634. Advanced Operations Management. (3)

Presentations and discussion of classical and current models and solution techniques in production and operations management.

635. Systems Analysis and Design. (3)

Application of business systems analysis and design to situations ranging from small intracompany functional units to large company-industry interactions.

636. Operations Management Seminar. (3)

Cases, readings, and research on current industrial practices and problems in production and operations management.

637. International Management and Production Techniques. (3)

An international look at manufacturing processes and relationships. This course considers variations that occur in policy and techniques between countries.

638. Strategic Issues in Manufacturing. (3)

A course designed to deal with the interface of strategy and manufacturing. Topics will include: capacity and facilities management, work force management, quality management, technology management, vertical integration, manufacturing infrastructure, manufacturing interface with other functions, and incorporating manufacturing in corporate strategy.

643 (MBA-OrgB 610). Management Philosophy and Style. (3)

A review of contemporary models of management and the development of a philosophy of management.

644. Advanced Personnel Administration. (3)

Prerequisite: One course in statistics and/or research methodology. An examination of personnel functions from a theoretical, applied, and research orientation: manpower planning, selection, interviewing, test validation, performance appraisal, equal opportunity, compensation, and employee relationships.

645. Managing Organization Cultures. (3)

An examination of the insights and skills used to diagnose the relationship between organizational mission and organizational culture. Primarily oriented toward getting students into organizations where they can apply and improve their skills and insights. The study of organizational culture involves an examination of the patterned customs and meanings of a particular group, such as taken-for-granted assumptions, values, and conceptual frameworks.

646. Organizational Theory. (3)

A review of concepts and research findings from psychology, social psychology, sociology, cultural anthropology, and systems theory that are useful in understanding behavioral forces operating in complex organizations and their implications for organizational development.

647 (MBA-OrgB 660R). Advanced Seminar in Organizational Behavior. (1-3)

A study of special topics or problems varying from semester to semester. Examples of such seminar topics are: conflict resolution, power and influence, intergroup relations, career development and planning, and management skills.

648. Dynamics of Organization Change: Interventions and Strategies. (3)

An examination of the forces operating to induce or resist change in organizations, and the strategy and tactics of organization change. Students are exposed to current methods of producing organization change.

650. Marketing Research and Information Systems. (3)

A consulting course that blends marketing theory and practice and for which a commissioned, proprietary, marketing research project is the major component. Emphasis is given to problem identification and definition, descriptive research techniques, uni- and multivariate analysis, and development of actionable recommendations based on market data.

651. Buyer Behavior and Marketing Decisions. (3)

An exploration of the application of behavioral science concepts and consumer research methods and findings to marketing problems. Special focus is on analysis of the behavioral dimensions of markets and market segments as they influence marketing decisions.

652. Quantitative Methods and Market Analysis. (3)

Application of quantitative methods in marketing analysis, including various forecasting procedures, multidimensional scaling, multiple discriminant analysis, Bayesian decision making, analysis of variance, regression and correlation, and other techniques.

653. Seminar in Marketing. (3)

An intensive study of a selected marketing topic such as international marketing, social issues in marketing, government regulation of marketing, sales forecasting, institutions and channels, marketing in nonbusiness organizations, marketing theory, and marketing models.

654. Sales Management. (3)

An examination of the concepts of personal selling and sales management including the strategic role of personal selling; business-to-business selling; organizing, directing, and compensating the sales force; and evaluating sales performance.

655. Retailing Management. (3)

A management perspective of retail strategy, merchandising, inventory management, promotion, location, and control. Intended for those planning a retailing career.

656. Business Negotiating. (3)

Business managers are frequently involved in negotiating for resources and program approval and in negotiating with customers, financiers, and suppliers. This course teaches managerial negotiating skills through frequent student one-on-one and group negotiations that are videotaped and then reviewed.

657. Product Management. (3)

A functional examination of the development and management of consumer and international products. Attention is given to the selection of products, line planning, brand management, packaging, market testing, government regulations, market launch, and competitive strategy.

658. International Marketing. (3)

A study of the institutions and techniques relating to the marketing of goods and services in other countries. Attention is given to the international dimensions of product, price, distribution channels, and promotion as they are adjusted to meet the social, cultural, and political environments found in other countries.

659. Business-to-Business Marketing. (3)

Analysis of company and institutional markets, managing R&D and technical product development, building and managing customer relationships and service, and competitive bid pricing in the business market environment.

660. Strategic Marketing and Planning. (3)

Strategic market analysis and the development and implementation of a strategic marketing plan for a new product, new business, or an ongoing operation.

663. Entrepreneurial Perspective. (3)

Developing the awareness of and ability to apply existing knowledge about entrepreneurship to make better decisions when starting, growing, and harvesting business ventures.

684. Global Management 1. (3)

A foundation course for students interested in global management—international finance, operations, marketing, and strategy taught in an integrated format.

685. Global Management 2. (3)

Prerequisite: MBA 684.

A continuation of Global Management 1.

686. Real Estate Management. (3)

An application of the principles and techniques of property investments. Includes determination of value, financing arrangements, and marketing and management problems.

687. Risk Management. (3)

An examination of the importance of risk in personal and business affairs; the different methods of meeting risks; meeting insurable risks through insurance; risk and public policy.

688 (MBA-ManEc). Applied Econometrics. (3)

Prerequisite: ManEc 300, 301, calculus or equivalent, and a first course in econometrics.

Econometric techniques and applications.

689. Business Law. (3)

An introduction to the body of law that governs the behavior of corporate executives in their relations with the board of directors, stockholders, and general public.

690R. Management Field Study. (3)

Experience working with faculty and management in assisting businesses with specific projects.

692. Business in History. (3)

A course that puts business and management into a national and international perspective. A focus on selected cases of entrepreneurs, corporations, and industries. The course is divided into three parts: first, the origins of modern business and corporate activity in Europe; second, the development of modern business in the United States; and, third, the use of historical analysis as a tool for management. The course combines lectures, readings, cases, and discussions.

693R. Readings and Conference. (1-3)

Subject to be arranged with the instructor. Approval must be obtained from the MBA Office.

Note: To increase MBA students' international preparation, several classes will be offered in foreign languages under MBA 693R. Classes will be taught in Japanese, Korean, German, Spanish, and French. In addition, the Chinese Department offers a similar class in Chinese (Chin 347). These classes will be offered on a pass/fail basis with the purpose of increasing conversation and vocabulary in the language. Each class will be taught by language teachers assisted by international MBA students. Language classes can be repeated each semester.

Executive Master of Business Administration Courses

Along with the following required courses, participants in the Executive MBA Program will select 6 hours of electives from MBA Program elective course offerings.

500. Corporate Financial Reporting. (2.5)

A study of published corporate financial statements to aid in analysis of a wide variety of financial reporting issues.

502. Managerial Accounting 1. (2.5)

A study of the nature, objectives, and procedures of cost accounting. Topics include job costing, joint product costing, cost behavior analysis, standard cost, problems of cost allocation, and uses of cost data in management decision making.

510. Managerial Economics. (2.5)

Application of specific microeconomic principles to business operations in a market economy.

512. Macroeconomics and Business Environment. (2.5)

The study of aggregate economic fluctuations and their impact on business decisions.

520. Business Finance 1. (2.5)

A study of the short-term financing of a business operation. Development of techniques for financial planning, such as analysis of ratios, profitability, and liquidity.

522. Business Finance 2. (2.5)

A continuation of Business Finance 1. Examination of long-term financing and an analytical approach to such concepts as capital budgeting, valuation, reorganization, and dividend policy.

532. Statistical Methods/Quantitative Analysis. (2.5)

Introduction to applied business statistics. Emphasis is on hypothesis testing techniques and simple and multiple correlation and regression.

535. Operations Management 1. (2.5)

An examination of analytical methods for the management of business operations; techniques for design, operation, and control of operating systems.

536. Operations Management 2. (2.5)

A continuation of Operations Management 1.

544. Executive Organizational Behavior. (2.5)

An analysis of individual, group, and organization variables that inhibit or facilitate effective organizational functioning. Topics include motivation, rewards, leadership, conflict, decision making, structure, evaluation, and change.

552. Marketing Management. (2.5)

Development of analytical marketing tools and techniques and their utilization in case analysis and decision making in marketing management.

560R. Integrative Exercise. (5-1)

Integrated applications of case analysis and presentation skills. Students work as groups to analyze cases and formulate recommendations, then make professional presentations to groups representing management.

564. Written and Oral Communication. (2.5)

Examination of most frequent business communication techniques, learning of accepted business correspondence and report writing concepts, and development of skills that contribute to effectiveness in written situations in business. Analysis of oral communications techniques in practice and limited theory. Several experiences presenting orally before video cameras, with expert feedback; practice with oral presenting before peers; and supervised goal setting and self-improvement in oral communication situations.

680. Business Policy. (3)

A top-management approach to the problems of determining corporate strategy.

682. Ethics, Business, and Society. (3)

The heart of ethics is responsibility. This course examines the nature of personal and corporate responsibility from the perspective of the global system in which we all live.

An analysis of the forces operating business firms and those created by business firms, such as individual ethics, labor relations, urban affairs, race and sex discrimination, and government relations.

693R. Readings and Conference. (1-3)

Subject to be arranged with the instructor. Approval must be obtained from the MBA Office.

Note: To increase MBA students' international preparation, several classes will be offered in foreign languages under MBA 693R. Classes will be taught in Japanese, Korean, German, Spanish, and French. In addition, the Chinese Department offers a similar class in Chinese (Chin 347). These classes will be offered on a pass/fail basis with the purpose of increasing conversation and vocabulary in the language. Each class will be taught by language teachers assisted by international MBA students. Language classes can be repeated each semester.

Chemical Engineering

Chair: Richard L. Rowley, 350 CB, 378-2586
 Graduate Coordinator: William G. Pitt, 350 CB, 378-2589

Faculty/Specialties

Professors

- Bartholomew, Calvin H. (1973) PhD, Stanford University, 1972. Catalysis.
 Beckstead, Merrill W. (1977) PhD, University of Utah, 1965. Combustion of Solid Propellants.
 Hedman, Paul O'Dell (1977) PhD, Brigham Young University, 1973. Combustion/Gasification, Fossil Energy Reacting Flows, Chemical Propulsion.
 Rowley, Richard L. (1984) PhD, Michigan State University, 1978. Liquid-Mixture Transport Properties, Thermodynamics, Statistical Mechanics.
 Smoot, L. Douglas (1967) PhD, University of Washington, 1960. Combustion, Coal Gasification.
 Solen, Kenneth A. (1976) PhD, University of Wisconsin, Madison, 1974. Blood-Material Interactions, Blood Filtration, Microvascular Blood Flow.
 Terry, Ronald E. (1987) PhD, Brigham Young University, 1976. Enhanced Oil Recovery, Thermodynamics, Calorimetry, Process Control.

Associate Professors

- Fletcher, Thomas H. (1991) PhD, Brigham Young University, 1983. Combustion and Transport, Processes in Reacting Flow Systems, Computer Modeling.
 Hecker, William C. (1982) PhD, University of California, Berkeley, 1982. Catalysis, Chemical Kinetics, Fluidization, Coal and Oil Desulfurization, Auto Emissions Control.
 Oscarson, John L. (1974) PhD, University of Michigan, 1985. Vapor-Liquid Equilibria, Separation Processes, Corrosion.
 Pitt, William G. (1987) PhD, University of Wisconsin, Madison, 1987. Surface Chemistry, Blood-Surface Interactions, Protein Adsorption.

Assistant Professor

- Harb, John N. (1988) PhD, University of Illinois, 1988. Electrochemical Engineering, Coal Combustion, Mathematical Modeling.

Graduate Degrees and Programs

- MS Chemical Engineering
 MEM Engineering Management
 PhD Engineering

Integrated Master's Program

See page 38 of this catalog for a description of the integrated master's program in engineering. Special requirements for this program are basically the same as those for the MS degree in chemical engineering but include the following:

- I. Application requirements:
 - A. Formal application for admission submitted to the Office of Graduate Studies before completion of final 34 hours of combined graduate and undergraduate course work.
 - B. Cumulative GPA of 3.2 or higher at end of sophomore year.

II. Maintenance requirements:

- A. Cumulative GPA of 3.0 or above in upper division and graduate chemical engineering courses.
 - B. Satisfactory performance evaluation by the research advisor.
- III. Degree requirements:
 - A. Cumulative GPA of 3.0 or above in all master's degree courses.
 - B. Submission of a final study list during first semester of registration as a graduate student that specifies all technical elective courses.

Degree and Program Requirements

MS Chemical Engineering

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:

Fall	—March 1 (U.S. students seeking financial aid and international students)
	—May 1 (U.S. or Canadian students not seeking financial aid)
- Winter —July 1 (U.S. students seeking financial aid and international students)
- September 1 (U.S. or Canadian students not seeking financial aid)
- Spring —November 1 (U.S. students seeking financial aid and international students)
- January 1 (U.S. or Canadian students not seeking financial aid)

Applicants with a BS in a major other than chemical engineering must apply for summer term and arrive two weeks before the term begins.

B. Entrance examinations:

1. None for applicants who hold a BS from U.S. and Canadian schools.
2. International applicants must submit general GRE and TOEFL scores. GRE advanced engineering subject test recommended.

- II. Prerequisite: BS degree (or equivalent) in chemical engineering from a school accredited by the American Institute of Chemical Engineers. A BS degree in other engineering fields, chemistry, physics, material science, or metallurgy requires provisional admission.

Requirements for Degree

- I. Credit hours (34): Minimum 34 hours including 6–9 thesis hours (ChEn 699R).
- II. Required courses: ChEn 501, 531, 533, 535, 691R (every semester), and electives (13–15 hours). For requirements of special programs, see departmental brochure.
- III. Residence: See Residence Requirements on page 38.
- IV. Prospectus: Each student must submit a written prospectus on his or her proposed thesis topic.
- V. Thesis.
- VI. Examinations:

- A. Comprehensive qualifying examination on graduate engineering course work to be taken and passed generally at the middle of the second semester of the graduate program (see the department graduate handbook). The examination is offered once a year.
- B. Oral defense of thesis.
- VII. A cumulative GPA of 3.0 or above in all MS degree classes.

MEM Engineering Management

See page 109 of this catalog for a description of the interdisciplinary program in engineering management. MEM students who wish to take classes in the Chemical Engineering Department should confer with the department graduate coordinator to be assigned an advisor.

PhD Engineering

Admission and Entry

- I. Semesters of entry and application deadlines:
- | | |
|--------|--|
| Fall | —March 1 (U.S. students seeking financial aid and international students) |
| | —May 1 (U.S. or Canadian students not seeking financial aid) |
| Winter | —July 1 (U.S. students seeking financial aid and international students) |
| | —September 1 (U.S. or Canadian students not seeking financial aid) |
| Spring | —November 1 (U.S. students seeking financial aid and international students) |
| | —January 1 (U.S. or Canadian students not seeking financial aid) |

Applicants with a BS in a major other than chemical engineering must apply for summer term and arrive two weeks before the term begins.

- II. Entrance examinations:
- A. None for applicants who hold a BS or MS degree from U.S. or Canadian schools.
 - B. International students must submit general GRE and advanced engineering subject test as well as TOEFL scores.
- III. Prerequisite: BS degree (or equivalent) in chemical engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a minimum GPA of 3.0 in upper-division Chemical Engineering courses. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree

- I. Credit hours: Minimum of 68 semester hours, at least 50 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (ChEn 799R).
- A. Candidates without a master's degree: Of the 50 hours, a minimum of 41 hours must be graduate-level courses. At least 12 hours of the 50 must be advanced mathematics, statistics, or computer science (a portion of which may be upper-division undergraduate level with specific departmental approval), and a minimum of 18 hours of dissertation (ChEn 799R).

- B. Candidates with a master's degree: With advisory approval, up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics, statistics, or science.
- II. Required courses: ChEn 501, 531, 533, 535, 791R (every semester), 12 hours of advanced mathematics, statistics, or science, and 28 hours of elective courses.
- III. Study list: The graduate study list must be submitted during the first semester of doctoral study.
- IV. Residence: See Residence Requirements on page 38.
- V. Comprehensive qualifying examination: Students must take and pass a written comprehensive qualifying examination based on graduate course work. The results of this examination are considered together with other performance criteria in evaluating the student for admission to candidacy.
- VI. Prospectus: Each student must submit and successfully defend a written prospectus on his or her proposed dissertation research topic at least one year before completion of the degree.
- VII. Dissertation.
- VIII. Oral defense of dissertation.
- IX. A cumulative GPA of 3.0 or above in all PhD courses.

Combustion Engineering Minor

- I. Credit hours:
- A. Master's level: 9 hours.
 - B. Doctoral level: 12 hours.
- II. Required courses: ChEn 533, 591R (each semester in residence), 633, 733.
- III. Electives: Select from Chem 759R, ChEn 561, 641, 693R.
- IV. Research in combustion-related area.
- V. Examination: Comprehensive examination.

Chemical Engineering Graduate Courses

500. Creative Skills in Chemical Engineering. (1)

The application of creativity and technical knowledge from prior course work to the solution of relevant, open-ended problems.

501. Directed Graduate Studies. (2)

Guided preparation for the department comprehensive exams and for the formulation of the research prospectus.

510. Principles of Reservoir Engineering. (3) On dem.

Prerequisite: ChEn 373.

Reservoir and hydrocarbon classification; fluid flow; primary oil and gas recovery mechanisms; enhanced oil recovery.

518. Biomedical Engineering Principles. (3)

Prerequisite: ChEn 376, Math 215.

The application of chemical engineering principles to model physiologic systems and to solve medical problems.

531. Thermodynamics of Multicomponent Systems. (3)
Prerequisite: ChEn 373 or Chem 461.

Fundamental concepts and applications in first and second laws, equilibrium and stability, phase equilibrium, and homogeneous and heterogeneous chemical equilibrium.

533. Transport Phenomena. (3)

Prerequisite: concurrent registration in ChEn 476. Recommended: Math 323.

Study of transport mechanisms and coefficients and of fundamental field equations for momentum, heat, and mass transport, with application to system design.

534. Advanced Separations. (3) Alt. yr.

Prerequisite: ChEn 533, Math 321.

General theory of differential and stagewise diffusional and separation operations, multicomponent distillation, extraction, and absorption; application of this theory to solution of complex problems, including column design and instrumentation.

535. Kinetics and Catalysis. (3)

Prerequisite: ChEn 478.

Theories and principles of chemical kinetics, including heterogeneous catalysis and reactor design.

536. Digital Process Control. (2)

Prerequisite: ChEn 436.

Computer application of advanced control algorithms to chemical processes.

541. Computer Design Methods. (2) Alt. yr.

Prerequisite: Math 311, ChEn 376.

Computer-aided design and numerical methods of chemical engineering processes.

578. Polymer Science and Engineering. (3)

Prerequisite: introductory materials engineering course.

Fundamentals of polymer chemistry and physics, and their implications in engineering applications. Topics include polymerization chemistry, structure-property relationships, polymer physics, and transport properties.

591R. Combustion Seminar. (0.5)

Combustion-related technical presentations by faculty and invited speakers.

631. Applied Statistical Mechanics. (3) Alt. yr.

Prerequisite: Chem 461; ChEn 531 or equivalent.

Fundamentals of statistical mechanics and their application to calculating thermodynamic and transport properties of fluids and fluid mixtures.

633. Combustion Processes. (3)

Prerequisite: ChEn 533 or equivalent.

Fundamentals of transport processes in reacting flow systems with specific applications of various combustion processes.

635. Advanced Topics in Catalysis and Kinetics. (1-3)

On dem.

Prerequisite: ChEn 535, Math 321.

Specialty topics in catalysis and kinetics, including catalyst deactivation, catalyst characterization, reactor design, and reaction modeling.

641. Combustion Modeling. (3) On dem.

Prerequisite: ChEn 633, Math 415.

Theory of combustion systems and quantitative procedures for computing performance of combustion chambers. Applications include turbulent combustion of gases, sprays, and particulates.

674. Advanced Thermodynamics. (2) On dem.

Advanced thermochemistry applied to such topics as measuring heats of mixing, heats of reaction, and equilibrium constants.

678. Colloid and Surface Phenomena. (3) On dem.

Prerequisite: ChEn 578 or instructor's consent.

Introduction to the theory and applications of colloid and surface science. Topics include sedimentation, diffusion, colloid thermodynamics, viscosity, surface energy, adsorption, and flocculation.

685. Chemical Engineering for Chemistry Students. (6)

On dem.

Intensive treatment of fundamentals of material and energy balances, fluid flow, and heat and mass transfer, with application to design and analysis of engineering systems.

691R. Seminar for Master's Students. (0.5)

Technical presentations by graduate students, faculty members, and guests.

693R. Special Topics—Graduate. (1-6)

697R. Special Problems—Graduate. (2-6)

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-6)

733. Coal Combustion. (3) Alt. yr.

Prerequisite: ChEn 633, Math 323.

Fundamentals of coal combustion and gasification processes, including particle mechanics, devolatilization, heterogeneous oxidation, radiative heat transfer, and combustion of coal in practical flames.

791R. Seminar for Doctoral Students. (0.5)

793R. Selected Topics in Chemical Engineering. (1-3)

Topics vary according to student-faculty research interests.

799R. Doctoral Dissertation. (1-9)

Chemistry

Chair: Earl M. Woolley, 226 ESC, 378-3669.

Graduate Coordinators: Richard T. Hawkins, 310-B ESC,

378-2569 (Chemistry); S. Scott Zimmerman, 693

WIDB, 378-4100 (Biochemistry)

Faculty/Specialties

Professors

Bills, James L. (1963) PhD, Massachusetts Institute of Technology, 1963. Inorganic Chemistry.

Boero-Goates, Juliana (1981) PhD, University of Michigan, 1979. Physical Chemistry.

Bradshaw, Jerald S. (1966) PhD, University of California, Los Angeles, 1963. Organic Chemistry.

- Cluff, Coran L.** (1960) PhD, University of Michigan, 1961. Inorganic Chemistry.
- Dalley, Nelson Kent** (1968) PhD, University of Texas, Austin, 1968. Analytical Chemistry.
- Eatough, Delbert J.** (1971) PhD, Brigham Young University, 1967. Physical Chemistry.
- Farnsworth, Paul B.** (1981) PhD, University of Wisconsin, Madison, 1981. Analytical Chemistry.
- Grant, David M.** (1986—Joint Appointment with the University of Utah) PhD, University of Utah, 1958. Physical Chemistry.
- Hansen, Lee Duane** (1972) PhD, Brigham Young University, 1965. Inorganic Chemistry.
- Hawkins, Richard T.** (1959) PhD, University of Illinois, 1959. Organic Chemistry.
- Lamb, John D.** (1985) PhD, Brigham Young University, 1978. Inorganic Chemistry.
- Lee, Milton L.** (1976) PhD, Indiana University, 1975. Analytical Chemistry.
- Mangelson, Nolan F.** (1969) PhD, University of California, Berkeley, 1967. Physical Chemistry.
- Mangum, John Harvey** (1963) PhD, University of Washington, 1963. Biochemistry.
- Nordmeyer, Francis R.** (1972) PhD, Stanford University, 1967. Inorganic Chemistry.
- Ott, J. Bevan** (1960) PhD, University of California, Berkeley, 1959. Physical Chemistry.
- Owen, Noel L.** (1986) PhD, Cambridge University, 1964; DSc, University of Wales, 1983. Physical Chemistry.
- Paul, Edward G.** (1965) PhD, University of Utah, 1962. Organic Chemistry.
- Pugmire, Ronald J.** (1986—Joint Appointment with the University of Utah) PhD, University of Utah, 1966. Physical Chemistry.
- Robertson, Donald Lee** (1980) PhD, Washington University, 1976. Biochemistry.
- Robins, Morris J.** (1986) PhD, Arizona State University, 1965. Organic Chemistry.
- Smith, Marvin A.** (1966) PhD, University of Wisconsin, Madison, 1964. Biochemistry.
- Snow, Richard L.** (1957) PhD, University of Utah, 1957. Physical Chemistry.
- Thorne, James M.** (1966) PhD, University of California, Berkeley, 1966. Physical Chemistry.
- Watt, Gerald D.** (1989) PhD, Brigham Young University, 1966. Inorganic Chemistry.
- Wilson, Byron J.** (1965) PhD, University of Washington, 1961. Inorganic Chemistry.
- Woolley, Earl M.** (1970) PhD, Brigham Young University, 1969. Analytical Physical Chemistry.
- Associate Professors**
- Fleming, Steven A.** (1985) PhD, University of Wisconsin, Madison, 1984. Organic Chemistry.
- Goates, Steven R.** (1981) PhD, University of Michigan, 1981. Analytical Chemistry.
- Rossiter, Bryant E.** (1985) PhD, Stanford University, 1981. Organic Chemistry.
- Shirts, Randall B.** (1991) PhD, Harvard University, 1979. Physical Chemistry.
- Zimmerman, S. Scott** (1978) PhD, Florida State University, 1973. Biochemistry.

Assistant Professors

- Dearden, David V.** (1994) PhD, California Institute of Technology, 1989. Analytical/Physical Chemistry.
- Simmons, Daniel L.** (1989) PhD, University of Wisconsin, Madison, 1986. Biochemistry.

Graduate Degrees and Programs

- MS, PhD Chemistry
MS, PhD Biochemistry

Areas of Specialization

Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry.

Degree and Program Requirements

All graduate programs in chemistry and biochemistry have these features in common:

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
 - Fall —February 15 (U.S. and international)
 - Winter —June 30 (international)
 - August 15 (U.S.)
 - Fall semester entrance is strongly recommended. Limited admissions will be made for entry in winter semester and spring and summer terms if space is available.
- B. Standardized exams: In addition to a completed BYU graduate application, official GRE General Test and chemistry or biochemistry GRE examination results are required from all applicants. Official TOEFL examination results are also required from persons whose first language is not English.
- II. Written examinations of a student's undergraduate preparation in five areas of chemistry are given during the week preceding the first semester of enrollment. Deficiencies may be removed by repeating a failed examination or (in special cases with departmental approval) by taking specified undergraduate courses (with a grade of B [3.0] or better).
- III. Teaching: The Chemistry Department relies on its graduate students to fill many assignments in laboratory and recitation instruction. Unless excused by the faculty, a graduate student is expected to be a teaching assistant for at least two semesters at 20 hours a week during residency toward the doctoral degree. Master's degree candidates are expected to teach half this amount.

MS Chemistry**Admission and Entry**

- I. Application requirements: See above.
- II. Prerequisite: Baccalaureate degree in chemistry, or equivalent.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Chem 699R).
- II. Required courses: Chem 594R (every semester in residence), 699R; other courses as specified by committee.
- III. Minors permissible: Any approved minor.

- IV. Annual progress review and/or examination.
- V. Thesis.
- VI. Examination: Final oral examination consisting of two parts:
 - A. Public presentation of original research described in thesis.
 - B. Comprehensive examination on course work, research, and thesis.

MS Biochemistry

Admission and Entry

- I. Application requirements: See above.
- II. Prerequisite: Baccalaureate degree in physical, biological, or agricultural sciences from an accredited institution; applicants with degrees in fields other than chemistry should have successfully completed one-year courses in general/analytical, organic, and physical chemistry.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Chem 699R).
- II. Required courses: Chem 585R and 594R (every semester in residence), 582, 584, 699R.
- III. Minors permissible: Any established minor in the physical, biological, agricultural, or food sciences, or any combination thereof.
- IV. Annual progress review and/or examination.
- V. Thesis.
- VI. Examinations: Final oral examination and defense of thesis consisting of two parts:
 - A. Public presentation of original research described in thesis.
 - B. Comprehensive examination on course work, research, and thesis.

PhD Chemistry

Admission and Entry

- I. Application requirements: See above.
- II. Prerequisite: Baccalaureate degree in chemistry, or equivalent.

Requirements for Degree (all to be approved by advisory committee)

- I. Credit hours (54): Minimum 36 course work and research hours plus 18 dissertation hours (Chem 799R). With departmental approval, some credit from an MS degree may be applied toward this requirement.
- II. Required courses: Chem 594R (every semester in residence), 799R; other courses as specified by committee.
- III. Minors permissible: Any approved minor.
- IV. Research.
- V. Annual progress review and/or examination.
- VI. Comprehensive exam: written and/or oral.
- VII. Dissertation.
- VIII. Examinations: Oral examination on the dissertation consisting of two parts:
 - A. Public presentation of original research described in dissertation.
 - B. Oral examination, primarily on dissertation.

PhD Biochemistry

Admission and Entry and Requirements for Degree

Same as for doctor of philosophy degree in chemistry, with the following exceptions:

- I. Prerequisite: Baccalaureate degree in physical, biological, or agricultural sciences from an accredited college or university. Those with baccalaureate degrees in fields other than chemistry should have successfully completed one-year courses in general/analytical, organic, and physical chemistry.
- II. Required courses: Chem 585R and 594R (every semester in residence); 582, 584.
- III. Minor: Any established minor in the physical, biological, agricultural, or food sciences, or any combination thereof.

Chemistry Graduate Courses

497R. Undergraduate Special Problems. (1-6) F, W, Sp, Su

Prerequisite: instructor's consent and Chem 501 or concurrent registration.

Undergraduate research experience emphasizing student development.

501. Chemical Handling and Safe Laboratory Practices. (0.5) F, Sp

Survey of appropriate methods in handling hazardous materials and disposing of waste. Legal rights and requirements. Safety in chemistry laboratory work.

514. Inorganic Chemistry. (3) W

Prerequisite: Chem 462 or 468.

In-depth treatment of theoretical concepts in inorganic chemistry and the descriptive chemistry of some of the elements.

518. Inorganic Synthesis. (2) On dem.

Prerequisite: Chem 501 or concurrent registration; 514. Syntheses that demonstrate a variety of techniques and a range of inorganic materials.

522. Chemical Instrumentation. (3) On dem.

Prerequisite: Chem 227.

Introduction to analog and digital circuits, including computer architecture; provides basis for understanding computer control of modern chemical instrumentation.

523. Instrumental Analysis. (3) F

Prerequisite: Chem 464, 501, or concurrent registration.

Modern instrumental methods and basic principles of instrumentation. Laboratory experience with a variety of instruments.

524. Analytical Chemistry. (2) W alt. yr.

Prerequisite: Chem 523.

Advanced theory of measurements and techniques in chemical analysis.

552. Advanced Organic Chemistry. (3) F

Prerequisite: Chem 351, 352, 461, 462.

Emphasizes physical aspects of organic chemistry; mechanisms, reaction intermediates, bonding, stereochemical and stereoelectronic effects, molecular orbital theory, Lewis acidity and basicity.

553. Advanced Organic Chemistry. (3) W

Prerequisite: Chem 351, 352.

Emphasizes synthetic aspects of organic chemistry; oxidations, reductions, concerted reactions, stereoselectivity, synthetic equivalents, protecting groups. Examples of natural product total synthesis presented.

561. Chemical Thermodynamics. (3) F

Prerequisite: Chem 462.

Development of the principles of chemical thermodynamics, including laws, pure materials, mixtures, equilibria, and elementary statistical mechanics.

563. Reaction Kinetics. (3) W alt. yr.

Prerequisite: Chem 462.

Theoretical aspects of chemical kinetics in the gas phase and in solution. Rates and mechanisms in solution, rapid reactions, and other topics.

564. Nuclear Chemistry and Radiochemistry. (2-3) W alt. yr.

Prerequisite: Chem 462.

Introduction to nuclear structure, radioactivity, nuclear spectroscopy, and nuclear reactions, emphasizing applications in chemistry.

565. Introduction to Quantum Chemistry. (3) F

Prerequisite: Chem 462.

Introduction to physical and mathematical aspects of quantum theory, emphasizing application of the Schrödinger wave equation to chemical systems.

569. Fundamentals of Spectroscopy. (3) W

Prerequisite: Chem 462 or 468; 523.

Atomic and molecular spectroscopy and application of group theoretical concepts. Types of experiments and interpretation of data.

582. Biochemistry of the Nucleic Acids. (3) W

Prerequisite: Chem 481.

Second-semester biochemistry. Nucleic acid biochemistry and molecular biology: nucleotide metabolism, chromosome and chromatin structure, DNA structure and replication, RNA transcription and gene expression, protein synthesis and regulation, eukaryotic gene systems.

584. Biochemistry Laboratory. (2) W

Prerequisite: Chem 481.

Modern research instrumentation and current biochemical research procedures. Enzyme isolation and characterization, protein sequencing, nucleic acid manipulations.

585R. Biochemistry Seminar. (0.5-1) F, W

Current topics discussed by guests, faculty, and graduate students. Required of graduate students in biochemistry each semester in residence.

586. Recombinant DNA. (2) W

Prerequisite: Chem 481.

Laboratory course covering major techniques involved in isolation, amplification, and cloning of recombinant DNA. Variety of cloning systems and methods of identification introduced.

594R. General Seminar. (0.5) F, W

Research topics presented by faculty and visiting scientists. Required every semester in residence.

596R. Special Topics in Chemistry. (1-3) On dem.

Prerequisite: Chem 352; 367 or 461.

Subjects that may be offered include:

- Atmospheric Chemistry
- Ion Chromatography
- Organic Spectroscopic Identification

619R. Advanced Topics in Inorganic Chemistry. (1-3) F

Prerequisite: Chem 514.

The following topics are rotated:

- Chemistry of the Main Group Elements. F alt. yr.
- Chemistry of the Transition Elements. F alt. yr.

629R. Advanced Topics in Analytical Chemistry. (1-3) W

Prerequisite: Chem 524.

The following topics are rotated:

- Separation Methods of Analysis. W alt. yr.
- Spectroscopic Methods of Analysis. W alt. yr.

659R. Advanced Topics in Organic Chemistry. (1-3)

Prerequisite: Chem 553.

The following topics are rotated:

- Organic Heterocyclic Compounds. W alt. yr.
- Organometallic Chemistry. W alt. yr.
- Organic Photochemistry. F alt. yr.

669R. Advanced Topics in Physical Chemistry. (2-3)

Prerequisite: Chem 361 and/or 565.

The following topics are rotated:

- Advanced Chemical Thermodynamics. W alt. yr.
- Quantum Chemistry. Every 3rd yr. on dem.

689R. Advanced Topics in Biochemistry. (1-3)

Prerequisite: Chem 582.

The following topics are rotated:

- Biomembranes and Bioenergetics. F alt. yr.
- Metabolic Integration. F alt. yr.
- Proteins and Enzymes. W alt. yr.

697R. Master's Candidate Research. (1-6) F, W, Sp, Su

Prerequisite: Chem 501 or concurrent registration.

699R. Master's Thesis. (1-9) F, W, Sp, Su**719R. Selected Topics in Inorganic Chemistry. (1-3) On dem.**

Subjects that may be offered include:

- Bioinorganic Chemistry
- Coordination Chemistry
- Environmental Chemistry

729R. Selected Topics in Analytical Chemistry. (1-3) On dem.

Subjects that may be offered include:

- Atomic Spectroscopy
- Chromatography
- Electrochemical Methods of Analysis
- Molecular Spectroscopy
- X-Ray Structure Analysis

759R. Selected Topics in Organic Chemistry. (1-3) On dem.

Subjects that may be offered include:

- Medicinal Chemistry
- Natural Products
- Nucleoside and Nucleotide Chemistry
- Stereoselective Synthesis

769R. Selected Topics in Physical Chemistry. (1-3) On dem.

Subjects that may be offered include:

- Advanced Group Theory
- Advanced Techniques in Magnetic Resonance
- Calorimetry
- Molecular Structure and Spectroscopy
- Solid-State Chemistry
- Statistical Mechanics

789R. Selected Topics in Biochemistry. (1-3) On dem.

Subjects that may be offered include:

- Biochemistry of Retroviruses
- Biologically Active Peptides
- Biopolymer Conformational Analysis
- Gene Expression in Higher Plants
- Metabolism
- Molecular Biology of Cancer
- Transmembrane Signalling

797R. Doctoral Candidate Research. (1-9) F, W, Sp, Su

Prerequisite: Chem 501 or concurrent registration.

799R. Doctoral Dissertation. (1-9) F, W, Sp, Su

Civil and Environmental Engineering

Chair: S. Olani Durrant, 368-C CB, 378-2811

Graduate Coordinator: A. Woodruff Miller, 368-K CB,
378-6331

Faculty/Specialties

Professors

- Balling, Richard J. (1982) PhD, University of California, Berkeley, 1982. Structural Mechanics.
Benzley, Steven Edward (1980) PhD, University of California, Davis, 1971. Structural Mechanics.
Budge, W. Don (1964) PhD, University of Colorado, 1964. Transportation and Materials.
Christiansen, Henry N. (1965) PhD, Stanford University, 1962. Structural Mechanics and Computer Graphics.
Durrant, S. Olani (1970) ScD, New Mexico State University, 1969. Structures and Structural Mechanics.
Merritt, LaVere B. (1970) PhD, University of Washington, 1970. Environmental and Water Resources.
Miller, A. Woodruff (1974) PhD, Stanford University, 1975. Hydrology and Hydraulics.
Sederberg, Thomas W. (1978) PhD, Purdue University, 1983. Structural Mechanics and Computer Graphics.
Wilson, Arnold (1957) PhD, Oklahoma State University, 1973. Structures and Concrete.
Youd, T. Leslie (1984) PhD, Iowa State University, 1967. Geotechnical Engineering.

Associate Professors

- Borum, M. Brett (1987) PhD, Clemson University, 1985. Environmental Engineering.
Goodwin, Reese J. (1967) PhD, University of Utah, 1976. Structures.
Jensen, David W. (1993) PhD, Massachusetts Institute of Technology, 1986. Structures and Advanced Composites.
Rollins, Kyle M. (1987) PhD, University of California, Berkeley, 1987. Geotechnical Engineering.

Thurgood, Glen S. (1967) PhD, Texas A&M University, 1975. Traffic and Transportation.

Wallace, Lynn P. (1983) PhD, West Virginia University, 1970. Water Resources, Environmental and Surveying.

Assistant Professor

- Jones, Norman L. (1991) PhD, University of Texas, Austin, 1990. Geotechnical Engineering.

Graduate Degrees and Programs

- MS Civil and Environmental Engineering
MEM Engineering Management
PhD Engineering

Integrated Master's Program

See page 38 of this catalog for a description of the integrated master's program in engineering. Special requirements for this program are basically the same as those for the MS degree in civil and environmental engineering but include the following:

I. Application requirements:

- A. Formal application for admission submitted to the Office of Graduate Studies before completion of final 30 hours of graduate degree.
- B. Cumulative GPA of 2.5 or better in civil engineering program at end of sophomore year.

II. Degree requirements:

- A. Cumulative GPA of 3.0 or above in all master's degree courses.
- B. Submission of final study list during first semester of registration as a graduate student.

Program and Degree Requirements

MS Civil and Environmental Engineering

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
 - Fall —February 28 (international)
 - May 15 (U.S.)
 - Winter —June 30 (international)
 - September 15 (U.S.)
 - Spring —October 31 (international)
 - February 20 (U.S.)
 - Summer —December 31 (international)
 - April 15 (U.S.)

B. Entrance examinations:

- 1. None for applicants who hold a BS from U.S. or Canadian schools.
- 2. International applicants must submit scores for general GRE, advanced engineering subject test, and TOEFL.

II. Prerequisite: Baccalaureate degree in civil engineering or its equivalent (students with other backgrounds will also be considered). Student will be required to make up any deficiencies.

Requirements for Degree

I. Credit hours (34 minimum):

- A. Thesis program: 34 minimum approved hours including 6-9 thesis hours (CEEn 699R).
- B. Project program: 34 minimum approved hours including a maximum of 3 project hours.

- II. Required course: CEEn 691R each fall and winter semester; no more than 1 hour can count toward the minimum hours required. Consult department for details.
- III. Residence: See Residence Requirements on page 38.
- IV. Examinations:
 - A. Successful completion of the fundamentals examination (FE), formerly the engineering-in-training (EIT) examination.
 - B. Oral defense of thesis or oral presentation of project.

MEM Engineering Management

See page 109 of this catalog for a description of the interdisciplinary program in engineering management. MEM students who wish to take classes in the Civil and Environmental Engineering Department should consult the department graduate coordinator to be assigned an advisor.

PhD Engineering

Admission and Entry

- I. Semesters of entry and application deadlines:
 - Fall —February 28 (international)
 - May 15 (U.S.)
 - Winter —June 30 (international)
 - September 15 (U.S.)
 - Spring —October 31 (international)
 - February 20 (U.S.)
 - Summer —December 31 (international)
 - April 15 (U.S.)
- II. Entrance examinations:
 - A. None for applicants who hold a BS or MS degree from U.S. or Canadian schools.
 - B. International students must submit scores for GRE General Test, advanced engineering subject test, and TOEFL (573 minimum).
- III. Prerequisite: BS degree (or equivalent) in civil engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a minimum GPA of 3.4 in the last 60 hours of technical and scientific course work. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree

- I. Credit hours: Minimum of 68 semester hours, at least 50 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (CEEn 799R).
 - A. Candidates without a master's degree: Of the 50 hours, a minimum of 38 hours must be graduate-level courses. At least 12 hours of the 50 must be advanced mathematics, statistics, or science (a portion of which may be upper-division undergraduate level with specific departmental approval), and a minimum of 18 hours of dissertation (CEEn 799R).

- B. Candidates with a master's degree: With advisory approval, up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics, statistics, or science.
- II. Required course: CEEn 691R (graduate seminar) each fall and winter semester; no more than 2 hours can count toward minimum hours required.
- III. Foreign language and skill requirement:
 - A. Students wishing to use language or a combination of language and skill subjects to meet this requirement should confer with the department.
 - B. Students taking the skill option must complete at least 18 hours of integrated study in mathematics beyond college trigonometry (Math 111 at BYU), statistics, or computer science. The 12 hours of advanced mathematics, statistics, or science required in item IA is in addition to this skill requirement.
- IV. Study list: The graduate study list must be submitted during the first semester of doctoral study.
- V. Residence: See Residence Requirements on page 38.
- VI. Comprehensive qualifying examination: Students must take and pass a written comprehensive qualifying examination based on graduate course work. After passing this examination, the student is accepted to candidacy for the doctoral degree. The examination is offered twice a year and is generally taken at the end of the first two semesters of the graduate program.
- VII. Prospectus: Students must submit and successfully defend a written prospectus on their proposed dissertation research topic at least one year before completion of the degree.
- VIII. Dissertation.
- IX. Oral defense of dissertation.

Civil and Environmental Engineering Graduate Courses

500. (CEEn-MeEn) Design and Materials Applications.

- (3)
Prerequisite: CEEn 203; MeEn 372 or CEEn 321
Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability—all as applied to mechanical design.

501. (CEEn-MeEn) Stress Analysis and Design of Mechanical Structures. (3)

- Prerequisite: CEEn 321 or MeEn 372.
Stress analysis and deflection of structures; general bending and torsion with computer applications to mechanical and aerospace structure design.

502. (CEEn-MeEn) Plasticity and Fracture Mechanics. (3)

- Prerequisite: CEEn-MeEn 503.
Continuum theory of plasticity, linear elastic fracture mechanics, introduction to structured continuum theories for polycrystalline media.

503. (CEEn-MeEn) Theory of Elasticity. (3)

Prerequisite: CEEEn 203, Math 321.

Tensor notation, stress and deformation tensors, constitutive equations, field equations; plane-stress/plane strain, axisymmetric, thermoelasticity, and large deformation problems.

504. (CEEn-MeEn) Matrix Structural Analysis. (3)

Prerequisite: CEEEn 321 or MeEn 372.

Matrix notation, principle of virtual forces, flexibility method, principle of virtual displacements, stiffness method, and general purpose computer programs for structural analysis.

505. Materials, Uses, and Properties of Concrete. (3)

Prerequisite: instructor's consent.

Manufacturing and testing of cements; concrete materials and concrete mix design; and techniques of concrete handling, placing, and treatment, including laboratory work.

506. (CEEn-MeEn) Introduction to Finite Element Method. (3)

Prerequisite: CEEEn 321 or MeEn 372.

Finite element stress analysis; mathematical foundations; simplex, isoparametric, bending, and axisymmetric elements; basic 2-D and 3-D modeling techniques; use of FEA computer software and hardware.

507. (CEEn-MeEn) Advanced Finite Element Analysis. (3)

Prerequisite: CEEn-MeEn 506.

Complex 3-D finite modeling, multiple element types, and mesh generation techniques. Application to thermal stress, nonlinear materials, and large deformations. Use of CAF software.

508. (CEEn-MeEn) Dynamics of Structures and Mechanical Systems. (3)

Prerequisite: Math 321; CEEEn 321 or MeEn 372; CEEn-MeEn 504.

Dynamic analysis of single and multi-degree-of-freedom systems, Ritz approximation, frequency domain analysis, geometric nonlinearity, and material nonlinearity.

509. (CEEn-MeEn) Spectral Analysis of Dynamic Systems. (3)

Prerequisite: Math 321, CEEEn 204.

Vibrations of elastic bodies and of systems with multiple degrees of freedom; random vibration. Computer-aided vibration testing and analysis.

513. (CEEn-Geog) Photogrammetry and Remote Sensing. (3)

Prerequisite: CEEEn 113.

Using data obtained from the visible range (photographs) and broader ranges (radar, microwaves, infrared, remote, etc.) of the electromagnetic spectrum to solve engineering problems with mapping procedures; photo and electronic data interpretation.

524. Design of Bridge Structures. (3)

Prerequisite: CEEEn 341, 424, 504.

Design of bridge composite; continuous beam and girder bridges including piers, abutments, floor systems, and bearings; field trips to observe bridge construction and fabrication.

526. Prestressed Concrete. (3)

Prerequisite: CEEEn 424, 504.

Basic theory, methods of pre- and post-tensioning, and details of design and fabrication applications to continuous structures.

529. Timber Design. (3)

Prerequisite: CEEEn 321.

Timber species, composition, and grades; design of beams, straight and tapered glue-lam girders, columns, connections, trusses, shear walls, and structural systems.

531. Water Resources Engineering. (3)

Prerequisite: CEEEn 431, 433.

Advanced hydrologic and hydraulic principles in planning and designing irrigation, drainage, flood control, and other water resource facilities.

535. Hydraulic Design of Channels and Control Structures. (3)

Prerequisite: CEEEn 431, 433.

Design of water conveyance channels and control structures, including siphons, chutes, weirs, flumes, dams, spillways, and outlet works.

542. Foundation Engineering. (3)

Prerequisite: CEEEn 341.

Integrating soil mechanics and structural design to elementary structures, including spread footings, combined footings, mat foundations, retaining walls, pile foundations, and caissons.

543. Earth- and Rock-Fill Structures. (3)

Prerequisite: CEEEn 341 or equivalent.

Design and construction of earth- and rock-fill dams, including selecting dam sites and materials, and applying seepage and pore pressure studies, shearing strength data, stability analysis, and construction controls.

545. Geotechnical Analysis of Earthquake Phenomena. (3)

Prerequisite: CEEEn 321, 341.

Earthquake magnitude and intensity potential; design ground motions, elementary dynamics of structures; response spectra; building code provisions; liquefaction and ground failure.

550. Water Quality Management. (3)

Prerequisite: CEEEn 351.

Philosophies, objectives, and methods of water quality management, including impact of various uses on water quality and behavior of pollutants in receiving waters.

555. Sanitary Engineering Analysis. (3)

Prerequisite: CEEEn 351.

Techniques for chemical and biological analysis of major organic and inorganic constituents of water, sewage, and industrial wastes.

561. Geometric Design of Highways. (3)

Prerequisite: CEEn 361.

Designing visual aspects of highways; highway classification, design controls and criteria, and design elements; vertical and horizontal alignment, cross sections, intersections, and interchanges; capacity analysis.

562. Characteristics and Operations of Traffic Engineering. (3)

Prerequisite: CEEn 361 or equivalent.

Traffic flow theory, operations and characteristics, including drivers and vehicles, parking facilities, at-grade intersections, channelization, traffic control devices, signals.

563. Pavement Design. (3)

Prerequisite: CEEn 361.

Properties and selection of pavement components, including soils, stabilized soil, base, subbase, subgrade, and bituminous materials, along with design of rigid and flexible pavements.

565. Transportation in Urban Planning. (3)

Prerequisite: instructor's consent.

Street classification and function; design elements of streets, intersections, and access drives; transportation planning studies; land use transportation interrelationships and improvement alternatives.

570. (CEEn-MeEn) Computer-aided Engineering Software Design. (3)

Prerequisite: FORTRAN, or C, or similar computer language background.

Programming techniques and structure for interactive engineering design software. Use of engineering library utility routines for computer graphics, data access, and user interface. Term project required.

571. (CEEn-MeEn) Engineering Computer Graphics and Software Design. (3)

Prerequisite: FORTRAN, or C, or similar computer language background.

Application of modern computer graphics techniques to engineering problems: 2-D and 3-D transformations, perspective, hidden surface removal, lighting, and shading. Graphics data structures, standards, and device independence. Software design methodology. Term project required.

572. (CEEn-MeEn) Computer-aided Geometric Design. (3)

Prerequisite: FORTRAN, or C, or similar computer language background.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects required.

575. (CEEn-MeEn) Optimization Techniques in Engineering. (3)

Prerequisite: Math 321 and FORTRAN or similar computer language.

Application of nonlinear and discrete optimization techniques to constrained engineering design. Theory and use of state-of-the-art computer routines.

580. Hazardous Waste Management and Control. (3)

Prerequisite: CEEn 351 or instructor's consent.

Hazardous waste statutes and regulations; introduction to hazardous waste treatment, storage, disposal, and monitoring techniques.

621. Design of Thin Shell Structures. (3)

Prerequisite: CEEn 424, 504.

Analysis of domes, cylindrical, folded plate, and hyper shells and the design of typical structures of reinforced concrete.

625. Design of Multistory Structures. (3)

Prerequisite: CEEn 423, 424, 441, 504, or instructor's consent.

Design of shear walls, floors, columns, frames, and foundations, using elastic and plastic methods, including frame response to lateral forces.

641. Advanced Soil Mechanics. (3)

Prerequisite: CEEn 441.

Theory of elasticity applied to soil; stress distribution in earth masses; strength and soil consolidation theories; settlement analysis, stability of slopes, and bearing capacity of soils.

644. Advanced Foundation Engineering. (3)

Prerequisite: CEEn 641.

Dewatering problems; shallow, pile, caisson, and machine foundations; foundations on collapsible and expansive soils; soil improvement techniques.

647. Groundwater Flow and Pollutant Transport Modeling. (3)

Prerequisite: CEEn 341, 431.

Techniques for modeling groundwater flow and pollutant transport in aquifers; seepage analysis of earth dams.

650. Water Treatment Facilities Design. (3)

Prerequisite: CEEn 433.

Evaluation, selection, and design of water treatment facilities.

651. Wastewater Treatment Facilities Design. (3)

Prerequisite: CEEn 351, 433.

Evaluation, selection, and design of wastewater treatment facilities.

654. Industrial Waste Treatment. (3)

Prerequisite: CEEn 650.

Treatment and disposal of industrial wastes; basic industries and their waste problems.

662. Traffic Simulation and Analysis. (3)

Prerequisite: CEEn 562 or instructor's consent.

Simulating and analyzing highway capacity, traffic flow, and traffic control problems; potential solutions using computer models.

691R. and Environmental Engineering Seminar. (0.5)**694R. Selected Problems in Civil and Environmental Engineering. (1-3) F, W, Sp, Su**

- 698R.** Master's Project. (1-3)
Prerequisite: master's graduate committee's consent.
- 699R.** Master's Thesis. (1-9)
Prerequisite: master's graduate committee's consent.
- 794R. Selected Topics in Environmental Engineering.** (1-3) F, W, Sp, Su
- 797R. Research for Doctoral Students.** (1-9)
- 799R. Doctoral Dissertation.** (1-9)
Prerequisite: master's graduate committee's consent.

Clothing and Textiles

Chair: Marvin C. J. Kuchar, 3256 SFLC, 378-7175

The Department of Clothing and Textiles does not offer a graduate degree but conducts classes for students who have completed the baccalaureate degree and are seeking additional practical experience in the field. Refer to the BYU Undergraduate Catalog for faculty listings. The following courses are available:

- 520R. Workshop in Clothing and Textiles.** (1-3) On demand.
Prerequisite: instructor's consent.

- 545. Period Pattern Making.** (3)
Prerequisite: CITx 225, 330, and instructor's consent.
Applying costume history and pattern making to period fashions. Hands-on experience in actual costume construction for theatre productions.

- 595R. Special Topics in Clothing and Textiles.** (1-3)
Prerequisite: 15 semester hours in clothing and textiles and instructor's consent.

- 599R. Merchandising Internship.** (3)
Prerequisite: CITx 110, 261, or 386; 374, 473, Acc 200, Bus M 340, 456, Comms 150, Econ 110, OrgB 320, and department's consent.

Full-time 15-week experience spent in fulfilling specific training assignments. Recommended elective for students in fashion merchandising.

Design prerequisite: CITx 261, 330, 451, and department's consent.

Communications

Chair: David P. Forsyth, E-509 HFAC, 378-2997
Graduate Coordinator: Daniel A. Stout, F-553 HFAC, 378-7551

Faculty/Specialties

Professors

- Barney, Ralph D. (1971) PhD, University of Missouri, Columbia, 1971. Media Ethics, International Communication, Media and Society.
- Burnett, M. Dallas (1958) PhD, Northwestern University, 1967. Communications Law.
- Forsyth, David P. (1990) PhD, Northwestern University, 1962. Media Research and Magazines.
- Gibb, J. Douglas (1969) PhD, Wayne State University, 1966. Human Communication Processes.

- Goodman, R. Irwin (1962) EdD, Indiana University East, 1969. Media Evaluation.
- Hainsworth, Brad E. (1984) PhD, University of Utah, 1968. Issues Management.
- Hughes, R. John (1991) International Media, Journalism, and Editorials.
- Martin, Dennis G. (1977) PhD, University of Illinois, 1985. Advertising and Cultural Anthropology, History of Advertising.
- Pratte, Paul Alfred (1984) PhD, University of Hawaii, 1976. Journalism History.
- Tarbox, Norman C. (1960) PhD, University of Utah, 1979. Broadcasting History.
- Valenti, JoAnn M. (1992) PhD, University of Michigan, 1983. Environmental Communications, Public Relations.
- Whiting, Gordon C. (1973) PhD, Michigan State University, 1967. Assessment of Media Quality.
- Associate Professors**
- Egan, Kathryn S. (1986) PhD, University of Southern California, 1972. Broadcast Women Research.
- Gale, Larrie Eldon (1978) PhD, University of Utah, 1973. Message Design, International Communication.
- Kagel, Richard L. (1973) PhD, Columbia Pacific University, 1980. Advertising Research.
- Nelson, Jack Adolph (1977) PhD, University of Missouri, Columbia, 1971. Magazines, Journalism History.
- Porter, William C. (1972) EdD, University of Oklahoma, 1986. New Technologies, Writing Theory.
- Wilson, Laurie J. (1989) PhD, American University, 1988. International Communications, Public Relations.

Assistant Professors

- Paystrup, Patricia (1993) PhD, Purdue University, 1993. Environmental Advocacy and Issues Management, Public Policy.
- Stout, Daniel A. (1978) PhD, Rutgers University, 1993. Media and Religion, Media and Children and Advertising.

Graduate Degree and Program

MA Communications

Degree and Program Requirements

MA Communications

Admission and Entry

- I. Application requirements:
A. Semesters of entry and application deadlines:
Fall —February 28 (international)
—May 15 (U.S.)
- B. Entrance examination: Miller Analogies Test.
- C. GPA: Minimum 3.0 GPA for last 60 semester hours.
- II. Prerequisite:
A. Baccalaureate degree.
- B. If undergraduate preparation in communications is not adequate, the department graduate coordinator will require certain courses to satisfy the deficiency.
- C. Background in research and statistics; prerequisite course required.

- D. Professional experience in communications is desirable.
 E. Professional competence in written and spoken English is necessary.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Comms 699R).
- II. Required courses: Comms 609, 610, 611, 612R, 616 (11 hours), 699R (6 hours); two courses from: 613, 615, 617.
- III. Electives: Determined in consultation with advisor and committee.
- IV. Thesis.
- V. Examinations:
 - A. Written comprehensive examination.
 - B. Final oral examination and defense of thesis.

Communications Minor

Consult the department chair or graduate coordinator regarding a recommended program of study.

Communications Graduate Courses

501. History of Mass Communications. (3)

Print, film, and broadcast communication media from their beginnings to the present; their roles as institutions in American society.

502. Electronic Media Criticism. (2)

Criticism of electronic media as systems and of their products and effects; critic's role and qualifications.

510. Mass Media Administration. (2)

Basic principles of management as they relate to organizing and administering newspapers, magazines, radio stations, and television stations.

515. Mini-Documentary Production. (2)

Prerequisite: Comms 441.

In-depth reporting and presentation of news, public affairs information miniseries, magazine formats, and documentary specials for both radio and television.

521. Opinion Writing. (3)

Prerequisite: Comms 312 or 316.

Function of editorials, columns, commentaries, and reviews in the mass media.

528. Magazine Editing and Publishing. (3)

Prerequisite: Comms 311, 312.

Layout and design for magazines and business publications. Contemporary practices in content and production.

538. Impact of New Media Technologies. (3)

Impact of computerized information delivery on traditional mass media and on society. Existing electronic systems.

550. Communicating Values Through Media. (2)

Variables influencing development of values through mediated messages.

555. Evaluating Media Programs and Products. (2)

Prerequisite: approved statistics class and instructor's consent.

Theory, techniques, procedures and tools used to evaluate radio and TV programs, videotapes, and audio tapes.

556R. Production Management of EFP and Studio Production. (2)

Prerequisite: Comms 243, 311, and instructor's consent.

Designing, managing and producing for broadcast, educational and corporate/industrial settings.

580. Comparative Mass Media Systems. (3)

Comparison of national media systems; normative theories of media organization and control.

581. International Communication. (3)

International information flow; information flow and foreign policy; international regulation; cultural imperialism; intercultural interaction.

582. Communications and National Development. (3)

Role of telecommunication, mass, and interpersonal communication in national development, focusing on the Third World; technology, policy and methods, problems, issues.

590R. Selected Readings and Projects. (1-2)

Independent research and study outside usual thesis work.

609. Proseminar. (1)

Introduction to graduate study and mass communication theory.

610. Studies in Communication Theory. (3)

Nature and content of contemporary communication theory.

611. Research Methods in Communication. (3)

Prerequisite: Stat 221 or equivalent.

Major methods of research used in communication; thesis writing and research.

612R. Research Practicum. (1)

Practical experience in research under direction of individual faculty.

613. Literature of Communications. (2)

Literature that contributes to understanding and functioning of communications processes.

615. Public Opinion and Propaganda. (3)

Concepts of public opinion and propaganda, their links to interpersonal and societal processes; mass media.

616. Seminar in Mass Media and Society. (3)

Mass media's roles in major social settings, historical development of open-system societies, contemporary ethical dilemmas, effects of new media.

617. Mass Communications and Government. (3)

Contemporary relationship between government and the mass media; philosophical and historical basis for regulation in light of constitutional guarantees.

690. Seminar in Communications. (1)

691R. Special Studies in Communications. (1-3)

Individual work on approved problems not leading to a thesis. Projects must be approved before registration.

695R. Topical Seminar. (1-3)

699R. Master's Thesis. (6V)

Computer Science

Chair: Dan R. Olsen, 3361 TMCB, 378-3027

Graduate Coordinator: David W. Embley, 3366 TMCB,
378-3027

Faculty/Specialties

Professors

- Barrett, William A. (1986) PhD, University of Utah, 1978.
Computer Vision, Image Processing, Pattern
Recognition.
- Burton, Robert P. (1974) PhD, University of Utah, 1973.
Hyperdimensional Graphics.
- Campbell, Douglas M. (1971) PhD, University of North
Carolina, 1971. Complexity Theory.
- Cornell, Aurel (1980) PhD, Polytechnic Institute of
Timisoara (Romania), 1971. Distributed/Concurrent
Programming.
- Embley, David W. (1982) PhD, University of Illinois,
1976. Database Systems, Semantic Modeling,
Object-oriented Software Development.
- Hays, Bill (1970) PhD, Northwestern University, 1970.
Database Systems, Compiler Development,
Programming Languages.
- Higgins, John C. (1961) PhD, University of California,
Davis, 1966. Theoretical Foundations.
- Ivie, Evan L. (1979) PhD, Massachusetts Institute of
Technology, 1966. Operating Systems.
- Norman, Theodore A. (1970) PhD, Washington State
University, 1970. Systems Simulation, 3-D Animation,
Operating Systems.
- Olsen, Dan R. (1985) PhD, University of Pennsylvania,
1981. Human-Computer Interfaces, Programming
Environments, Computer Graphics.
- Stokes, Gordon E. (1969) EdD, Brigham Young
University, 1981. Database Management, Human
Factors, Intelligent CBI Systems.
- Woodfield, Scott N. (1985) PhD, Purdue University, 1980.
Software Design, Reusability, Software Engineering.

Associate Professors

- Christensen, Larry C. (1983) EdD, Brigham Young
University, 1981. Expert Systems, Computer-aided
Instruction, Software Engineering, Intelligent CAI
Systems.
- Martinez, Tony (1987) PhD, University of California, Los
Angeles, 1986. Neural Networks, Parallel Processing.

Assistant Professors

- Egbert, Parris K. (1992) PhD, University of Illinois, 1992.
Computer Graphics, Geometric Modeling, Scientific
Visualization, Object-oriented Programming.
- Flanagan, J. Kelly (1993) PhD, Brigham Young
University, 1993. Computer Architecture,
Performance Evaluation, Digital System Design.
- Ng, Dennis (1991) PhD, Kansas State University, 1991.
Database Systems, Logic Programming.

Windley, Phillip J. (1993) PhD, University of California,
1990. Formal Methods, Hardware Verification,
Software Specification, Programming Language
Theory.

Graduate Degrees and Programs MS, PhD Computer Science

Degree and Program Requirements

MS Computer Science

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 20 (U.S. and international)
Winter —May 15 (U.S. and international)
Spring —September 15 (U.S. and international)
 - B. Entrance examinations:
 1. GRE General Test.
 2. TOEFL examination for those whose native
language is not English.
- II. Prerequisite: Baccalaureate degree in computer sci-
ence or equivalent course work in related under-
graduate programs.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours
plus 6 thesis hours (CS 699R).
- II. Required courses: Determined in consultation
with advisory committee.
- III. Thesis: Must have departmental acceptance of a
thesis proposal before beginning thesis research.
- IV. Examinations: Final oral examination and defense
of thesis.

PhD Computer Science

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 20 (U.S. and international)
Winter —May 15 (U.S. and international)
 - B. Entrance examinations:
 1. GRE General Test and GRE subject test in
computer science.
 2. TOEFL examination for those whose native
language is not English.
- II. Prerequisite: Baccalaureate degree in computer sci-
ence or equivalent (students with undergraduate
deficiencies should enroll in the MS program).

Requirements for Degree

- I. Credit hours (66): Minimum 48 course work hours
plus 18 hours of dissertation research. Must in-
clude CS 510, 512, and 561.
- II. Dissertation.
- III. Examinations:
 - A. Qualifying examinations: A series of examina-
tions demonstrating broad proficiency in com-
puter science. Qualifying exams must be taken
no later than one year from the student's admis-
sion to the program.

- B. Preliminary examination: Demonstrates preparedness to fulfill dissertation research.
- C. Oral defense of dissertation.
- IV. Residency: A student must spend at least the last three consecutive semesters as a full-time resident (combined spring and summer terms count as one semester).
- V. Teaching: All students must teach at least one course.

Program and Degree Resources

Artificial Intelligence and Expert Systems Laboratory
 Computer-based Instruction Laboratory
 Computer Vision Laboratory
 Interactive Software Systems Laboratory
 Laboratory for Applied Logic
 Networking / Communications Laboratory
 Neural Networks and Connectionist Computing Laboratory
 Operating Systems Laboratory
 Systems Modeling Laboratory

Computer Science Graduate Courses

501R. Special Topics in Computer Science. (1-3) F, W, Sp, Su

Prerequisite: instructor's consent.
 Special subjects as announced before each semester.

510. Formal Languages and Syntactic Analysis. (3) F

Alt. Sp or Su

Prerequisite: CS 431 or instructor's consent.

Definition of formal grammars and algorithms for syntactic analysis.

512. Analysis of Algorithms. (3) W

Prerequisite: CS 312, CS 252 or instructor's consent.

Survey of important algorithms. Connections to theoretical computer science and the analysis of algorithms.

521. Pattern Recognition. (3) Alt. W

Prerequisite: calculus and senior or graduate standing or instructor's consent. Recommended: linear algebra

Design and use of pattern classifiers for recognition and classification of one-and two-dimensional signals such as voice, images, and handwriting. Emphasis on images.

525. Software Creation. (3) F

Prerequisite: CS 428.

Principles associated with management of large software systems. Controlling development, cost and time estimations, metrics, team structures, configuration management, and quality assurance.

531. Compiler Theory and Design. (3) Alt. W

Prerequisite: CS 431.

Theory and design of compilers and interpreters, including syntax-directed compilers and metacompilers.

532. Advanced Programming Languages and Models. (3) Alt. W

Prerequisite: CS 431.

Definitions and implementation techniques for functional languages, logic languages, and object-oriented languages. Interactive languages and interactive programming environments.

535.(CS-Psych 577). Human-Computer Interaction. (3) F

Prerequisite: graduate or senior standing.

Human/machine interfaces for hardware/software integration. Psychological principles of computer interfacing. Human engineering, ergonomics, software design principles for user-friendly applications.

544. Advanced Operating Systems. (3) F

Prerequisite: CS 444.

Advanced operating system concepts and design techniques, including concurrency, distributed systems, networking, synchronization, multitasking, etc.

545. Process Control Systems. (3) W

Prerequisite: CS 444.

Concurrent and distributed real-time operating systems and programming environments for industrial automation.

550. Computer Vision 1. (3) F

Prerequisite: calculus and senior or graduate standing or instructor's consent. Recommended: linear algebra.

Image formation, reconstruction, compression, enhancement, edge detection, feature extraction, region growing, scene segmentation, boundary detection, morphological transforms, texture, and recovery of 3-D shape.

551. Relational Database Theory. (3) Alt. F

Prerequisite: CS 353.

Relational algebra and calculus, dependency, and normalization theory.

552. Object-oriented Database Systems. (3) W

Prerequisite: CS 353. Recommended: CS 453.

Object-oriented data models, database programming languages, object concurrency and transaction processing.

553. Logic Programming. (3) W

Prerequisite: CS 353.

Syntax and semantics of logic programs, unification, SLD-resolution, optimization, fixed point theory, negation, and stratification.

555. Advanced Computer Graphics. (3) W

Prerequisite: CS 455 or instructor's consent.

Advanced interactive computer graphics systems programming and architecture.

556. Interactive Software Systems. (3) W

Prerequisite: CS 330, 455.

Techniques to implement human/computer interfaces. Primitive interactive techniques. Grammar, automata, procedure, object-based dialogue descriptions. Tools for automatically generating and evaluating user interfaces. Screen layout; data presentation tools.

560. Computer Networks. (3) Alt. W

Prerequisite: CS 460, Stat 321.

Computer networking, software architecture, organization, protocols, routing, global networks, local networks, internetworking, standards, and applications.

561. Theoretical Foundations of Computer Science. (3) W, Alt, Sp or Su
Prerequisite: CS 252 or instructor's consent.

Formal languages, automata theory, sequential machines, enumerability, computability, and undecidability.

565. Data Security. (3) F

Prerequisite: CS 404. Recommended: CS 453, 560.

Data security problems and solutions. Protection of stored or transported data. Data security principles. Hardware and software systems; mathematical, technical, and legal considerations.

572. Machine Learning. (3) Alt, W

Prerequisite: Math 119 and graduate or senior standing.

Algorithms, approaches and philosophy of machine learning.

575. Expert Systems Design. (3) W

Prerequisite: CS 370 or instructor's consent.

Knowledge-based systems, fundamentals of knowledge engineering, rule-based systems, tools for expert system development.

576. Intelligent Tutoring. (3) Alt, Sp or Su

Prerequisite: CS 575 or instructor's consent.

Taxonomy of knowledge-based computer-assisted instruction; design and evaluation of intelligent tutoring models.

578. Neural Networks and Connectionist Computing.

(3) F

Prerequisite: CS 380, Math 119, and senior or graduate standing.

Neurally inspired computer architectures and methods of computation using massively parallel networks.

598R. Special Projects. (1-3) F, W, Sp, Su

Prerequisite: instructor's consent.

627. Theoretical Foundations of Software Engineering.

(3) Alt, Sp or Su

Prerequisite: CS 525.

Introduction to theory aspects of computer science that pertain to software engineering (proof of correctness, conceptual models).

650. Computer Vision 2. (3) Alt, W

Prerequisite: CS 550.

Advanced topics in computer vision: Robot vision, pick and place tasks, boundary tracking, image/object representation, stereo vision, photogrammetry, shape from shading, motion and optical flow, use of knowledge and models in vision systems.

678R. Topics in Neural Networks. (3) Alt, W

Prerequisite: CS 578.

Advanced research topics in areas of non-von Neumann computing, including neural, connectionist, and massively parallel systems. Course tailored toward students' research goals.

699R. Master's Thesis. (Arr.) F, W, Sp, Su

Prerequisite: committee chair's consent.

751R. Advanced Topics in Database Systems. (3) Alt,

Sp or Su

Prerequisite: graduate standing and instructor's consent.

799R. Doctoral Dissertation. (1-9) F, W, Sp, Su
Prerequisite: committee chair's consent.

Construction Management

See Technology Education and Construction Management.

Dance

Chair: Phyllis C. Jacobson, 294 RB, 378-5087

Faculty/Specialties

Professor

Jacobson, Phyllis C. (1957) PhD, University of Utah, 1971.
Administration, Dance Education, Physical Conditioning.

Associate Professors

Allen, Sandra Birch (1969) MFA, University of Utah, 1967. Ballet, Methodology, Technique, History.
Black, Catherine H. (1972) MFA, University of Utah, 1972. Dance History, Modern Dance, Choreography, Performance.

Davis, Susanne Johnson (1974) MS, Brigham Young University, 1971. Folk Dance, Cultural Aspects, Pedagogy.

Debenham, Hadd Patrick (1976) MA, University of California, Los Angeles, 1976. Modern Dance, Choreography, Technique, Performance, Musical Dance Theatre.

Diston, Leslie Allen (1982) MA, University of California, Los Angeles, 1970. Kinesiology, Modern Dance, Improvisation, Theatre Craft, Movement Analysis.

Gibb, Sara Lee (1965) MS, Brigham Young University, 1970. Modern Dance, Dance Education, Pedagogy, Therapy, History.

Assistant Professor

Prohosky, Caroline (1986) MA, University of California, Los Angeles, 1980. Modern Dance, Choreography, Technique, Performance.

Graduate Degree and Program MA Dance

Degree and Program Requirements

MA Dance

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
 - Fall —February 28 (international)
 - May 15 (U.S.)
 - Winter —June 30 (international)
 - September 15 (U.S.)
 - Summer —December 31 (international)
 - April 15 (U.S.)

- Full-time students may enter any semester, but fall semester or summer term is recommended (program is designed to be completed in four semesters). Summer term program designed to be completed in four summers.
- B. Entrance examination: GRE General Test.
- C. GPA: Minimum of 3.0 for the last 60 hours of undergraduate work.
- II. Prerequisite: Baccalaureate degree in dance with knowledge and competency equivalent to that required in the undergraduate program at Brigham Young University; applicants will be required to satisfy deficiencies.
- III. Audition: Applicants must audition in person or submit a videotape (or other suitable documentation) demonstrating basic dance competency and proficiency in one or more of the following areas: choreography, performance, pedagogy, and research.

Requirements for Degree

I. Choreography/Performance emphasis

A. Project/Thesis option:

1. Credit hours (30): Minimum 24 course work hours plus 6 project or thesis hours (Dance 698R or 699R).
2. Required courses (15 hours): Dance 540R or 630R (4 hours), 601 (1 hour), 610 (3 hours), 640 through 653 (3 hours), 660 through 663 (4 hours).
3. Dance electives (5 hours): Selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, 640 through 653, 660 through 663, 695R, 697R.
4. Electives (4 hours): Selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with advisory committee.
5. Completion of at least one advanced ballet or modern technique class during each semester of enrollment (may or may not be part of required or elective courses).
6. Successful periodic reviews of progress.
7. Formal presentation and documentation of student choreography and/or performance.
8. Project or thesis: Includes written and oral presentation of three-chapter thesis or project prospectus.
9. Examinations:
 - a. Comprehensive oral examination on course work.
 - b. Oral defense of project or thesis.

B. Course work option: Not available.

II. Pedagogy/Research emphasis

A. Project/Thesis option:

1. Credit hours (30): Minimum 24 course work hours plus 6 project or thesis hours (Dance 698R or 699R).
2. Required courses (15 hours): Dance 540R or 630R (4 hours), 601 (1 hour), 610 (3 hours), 640 through 653 (3 hours), 660 through 663

(4 hours). (Pedagogy emphasis must take 651.)

3. Dance electives (5 hours): Selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, 640 through 653, 660 through 663, 695R, 697R.
4. Electives (4 hours): Selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with advisory committee.
5. Successful periodic reviews of progress.
6. Formal written thesis or documentation of project.
7. Project or thesis: Includes written and oral presentation of three-chapter thesis or project prospectus.
8. Examinations:
 - a. Comprehensive oral examination on course work.
 - b. Oral defense of project or thesis.
- B. Course work option:
 1. Credit hours: Minimum 36 course work hours.
 2. Required courses (15 hours): Dance 540R or 630R (4 hours), 601 (1 hour), 610 (3 hours), 640 through 653 (3 hours), 660 through 663 (4 hours). (Pedagogy emphasis must take 651.)
 3. Dance electives (5 hours): Selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, 640 through 653, 660 through 663, 695R, 697R.
 4. Electives (6 hours): Selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with advisory committee.
 5. Support area (10 hours): Aggregate of graduate nondance courses forming a supplementary, specialized area of study. The first 10 hours of any minor may be used to satisfy this requirement.
 6. Successful periodic reviews of progress.
 7. Examination: Comprehensive oral examination on course work.

Dance Graduate Courses

500R. Workshop in Dance. (1-3)

Experience with Workshop in Dance: aerobic, ballet, ballroom, folk, modern.

540R. Modern Dance Technique and Theory 5. (2)

Prerequisite: Dance 340R or equivalent.

Advanced technique, with movement combinations emphasizing dance as a performance art.

555. Dance Production. (2)

Prerequisite: Dance 355 or equivalent.

Technical and design aspects of dance production.

562R. Modern Dance Composition, Advanced. (1)

Prerequisite: Dance 362 or instructor's consent.

Development of substantive modern dance compositional works based on intent, form, and content relationships.

563R. Modern Dance Improvisation, Advanced. (1)

Prerequisite: Dance 363 or instructor's consent.

599R. Cooperative Education: Dance Practicum. (1–6)

Field experience for teaching and performance in dance.

601. Introduction to Graduate Studies in Dance. (1)

Prerequisite: admission to graduate program.

Orientation to program requirements, evaluation of student aptitude for graduate studies, and introduction to bibliographic skills in dance research.

610. Research Methods in Dance. (3)

Designing, analyzing, and reporting on dance research. Topic selection, applicable dance research methods, interpreting, and critiquing dance research. Preparation of MA thesis prospectus.

630R. Dance Technique, Advanced. (1–2)

Prerequisite: instructor's consent.

Course designed for higher-level assignment and credit while attending ballet, ballroom, folk, or modern advanced technique course.

638R. Dance Performance. (1–2)

Prerequisite: instructor's consent.

Performing with a BYU dance company.

640. Creativity. (1)

Relationship of creativity to the discipline of dance.

641. Cultural Aspects of Dance. (1)

Cultural influences upon dance.

642. Current Trends in Dance. (1)**643. Dance Aesthetics.** (1)

Aesthetic principles and concepts as they relate specifically to dance as an art form.

650. Dance Criticism. (2)

Introduction to writings of major dance critics, issues in reviewing performances, and practice in writing reviews.

651. Dance Pedagogy. (2)

Prerequisite: undergraduate course in dance methodology or equivalent.

Nature and application of pedagogy from universal and dance perspectives.

652. Exploration of Dance Therapies. (2)

Study of concepts of and approaches in dance therapy and body therapies.

653. Movement Analysis Systems. (2)

Comparison of various systems of analyzing and recording movement. Emphasis on methods of objectifying movement to facilitate qualitative interpretation.

660. Dance Composition—Theory and Principles. (2)

Scholarly research in dance composition.

661. Dance Improvisation—Theory and Principles. (2)

Research in dance improvisation.

662. Dance Performance—Theory and Principles. (2)

Research in dance performance.

663. Dance Technique—Theory and Principles. (2)

Research in dance technique.

695R. Dance and Related Fine Arts. (1–4)

Interdisciplinary study integrating dance with art, literature, music, and theatre.

697R. Individual Research and Composition in Dance. (1–4)

Prerequisite: admission to graduate study in dance.

Pedagogical research, choreographic, or performance project (faculty approved and supervised). Presentation of resultant product required.

698R. Master's Project. (1–6)**699R. Master's Thesis.** (1–6)

Design

Chair: Robert T. Barrett, 210 BRMB, 378-2064

The Department of Design does not offer a graduate degree but offers the following graduate courses. Refer to the BYU Undergraduate Catalog for faculty listings.

Design Graduate Courses

610R. Advanced Problems in Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

630R. Advanced Problems in Industrial Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

631R. Advanced Presentation Methods for Industrial Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

640R. Advanced Problems in Graphic Design. (1–5)

Prerequisite: admission by portfolio.

Individual research and project development.

644R. Advanced Problems in Illustration. (1–5)

Prerequisite: admission by portfolio.

Individual research and project development.

Economics

Chair: Richard J. Butler, 130 FOB, 378-2859

Graduate Coordinator: Val Lambson, 130 FOB, 378-2859

The Department of Economics does not offer a graduate degree but offers the following graduate courses. Refer to the BYU Undergraduate Catalog for faculty listings.

Economics Graduate Courses

580. Advanced Price Theory. (3)

Prerequisite: Econ 378, 380, 382, or equivalent.

Individual behavior and markets.

581. Advanced Macroeconomics. (3)

Prerequisite: Econ 378, 380, 381, 382.

Income, unemployment, and price-level analysis.

582. Welfare Economics. (3)

Prerequisite: Econ 378, 380, 382.

General equilibrium theorems and considerations that must guide applied economic work and provide quantitative information on effects of alternative policy measures.

586. Mathematical Economics. (3)

Prerequisite: Econ 378, 380, 381, 382, or equivalent.

Mathematical modeling of economic behavior.

588. Econometrics. (3)

Prerequisite: Econ 378, 380, 381, 382, 388.

Theory and practice of economic measurement.

699R. Master's Thesis. (1–6)**Educational Leadership**

Chair: Ivan D. Muse, 310 MCKB, 378-4291

Faculty/Specialties**Professors**

Garfield, Rulon Roy (1978) PhD, University of Utah, 1964. Finance, Politics, Business.

Muse, Ivan D. (1970) EdD, University of Utah, 1966. Leadership, Curriculum, Gifted and Talented.

Ovard, Glen F. (1956) EdD, Stanford University, 1959. Principalship, Facilities.

Shute, R. Wayne (1974) EdD, University of Southern California, 1964. Instruction, Higher Education, Learning.

Van Alfen, Curtis N. (1967) EdD, University of Utah, 1967. Leadership, Higher Education, Change in Education.

Wasden, F. Del (1971) EdD, Brigham Young University, 1971. Law, Leadership.

Associate Professors

Butterfield, Dennis D. (1974) EdD, University of California, Los Angeles, 1972. Curriculum, Instruction.

Webb, Clark D. (1966) PhD, University of Texas, Austin, 1970. Instruction, Writing, Leadership.

Assistant Professors

Hite, Steven J. (1991) EdD, Harvard University, 1985. Human Development, Research.

Randall, E. Vance (1992) PhD, Cornell University, 1989. Educational Administration, Philosophy and Public Policy Analysis.

Graduate Degrees and Programs

MEd, EdD, PhD Educational Leadership

The Department of Educational Leadership assists students in developing individualized study plans. Each plan focuses the efforts of the student in areas of study that draw upon personal interests and background experiences to address important needs in the larger society. Emphasis may be developed in areas such as administration, curriculum, teaching and learning, higher education, finance, law, policy development, research,

educational philosophy, human resources development, or organizational behavior.

Administrative/Supervisory Certification

Graduate programs in the Department of Educational Leadership are not designed to complete administrative/ supervisory certification and endorsement requirements, but rather to prepare educational leaders with the necessary knowledge and skills for educational leadership. Students are advised to note the distinction as they plan for graduate study. Consult the department for information.

Students may take a program of study leading to an endorsement in teaching gifted and talented students. Sixteen hours of course work and field practice are required.

Degree and Program Requirements**MEd Educational Leadership****Admission and Entry****I. Application requirements:****A. Semesters of entry and application deadlines:**

Fall —February 28 (international)

—May 15 (U.S.)

Winter —June 30 (international)

—September 15 (U.S.)

Summer —December 31 (international)

—April 15 (U.S.)

Summer entry preferred.

B. Entrance examinations:

GRE General Test, GMAT, LSAT, or Miller Analogies Test; and for international applicants, TOEFL.

C. GPA: Minimum of 3.0 for last 60 hours.**II. Prerequisite:****A. Baccalaureate degree.****B. Curriculum and instruction or school administration emphasis: a minimum of one year professional experience.****Requirements for Degree****I. Credit hours: 36.****II. Required courses: Consult outline available in department office.****III. Study list: Should be submitted by the end of the first semester.****IV. Credit limitations: ELdr 515R or extension credit will not be counted toward a degree program.****V. Examinations: Final written and/or oral comprehensive examination covering course work.**

Minimum registration: Following admission to the MEd program, students will be expected to work continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 semester hours of approved program credit during each academic year (September 1 to August 31).

EdD Educational Leadership**Admission and Entry****I. Application requirements:**

- A. Semesters of entry and application deadlines:
Fall —January 15 (U.S. and international)
Winter —January 15 (U.S. and international)
Summer —January 15 (U.S. and international)
Full-time students: fall, winter, summer entry.
Summer Residency Program students: summer entry only.
- B. Entrance examination:
 1. GRE General Test, GMAT, LSAT, or Miller Analogies Test; and for international applicants, TOEFL.
 2. Department may require additional examinations.

II. Prerequisite:

- A. Master's degree.
- B. A minimum of three years' professional experience in a leadership position related to education.

Requirements for Degree

- I. Credit hours (90): Minimum of 78 course work hours plus 12 hours of dissertation (ELdr 799R); minimum of 45 hours taken in the BYU doctoral program. Credit earned in a recognized advanced degree program such as a master's or educational specialist may apply.
- II. Required courses:
 - A. See program outline available in department office.
 - B. Course work in research statistics.
- III. Study list: Should be submitted by the end of the first semester.
- IV. Credit limitations: ELdr 515R or extension credit will not be counted toward a degree program.
- V. Minor (optional): 18 hours in a department outside the College of Education.
- VI. Residence:
 - A. Full-time doctoral students: Two consecutive registrations (at least 6 hours each) on the BYU Provo campus.
 - B. Summer Residency Program students: Three consecutive full-time summer terms (at least 8 hours each) on campus, intervening on-site course work, and supervised field experiences.
 - C. Only 3 hours of dissertation credit may apply toward residency.
- VII. Dissertation: This must be a rigorous, independent, guided research project involving the identification and solution of a significant problem in educational leadership. Students should understand that the EdD emphasizes the application of theoretical constructs to educational policies and practices. Dissertations should reflect this emphasis. The EdD dissertation carries 12 credit hours and may not be undertaken until successful completion of the comprehensive examination and approval of the dissertation prospectus by the advisory committee and the department chair. The dissertation and prospectus defense are different in kind from course work per se; therefore, performance on these tasks may not correlate with performance in individual courses.

VIII. Examinations:

- A. Written and oral comprehensive examinations.
- B. Oral defense of dissertation.

Minimum registration: Following admission to the doctoral program, students will be expected to work continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 hours of approved program credit during each academic year (September 1 to August 31).

PhD Educational Leadership

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —January 15 (U.S. and international)
Winter —January 15 (U.S. and international)
Summer —January 15 (U.S. and international)
 - B. Entrance examinations:
 1. GRE General Test, GMAT, LSAT, or Miller Analogies Test; and for international applicants, TOEFL.
 2. The department may require additional examinations.
- II. Prerequisite:
 - A. Master's degree.
 - B. Educational leadership emphasizing administration candidates: Minimum of three years' professional experience in leadership and/or administration consistent with the major area of study.
 - C. Educational leadership emphasizing curriculum and instruction candidates: Minimum of three years' professional experience consistent with major area of study.

Requirements for Degree

- I. Credit hours (96): Minimum of 78 hours beyond the baccalaureate degree including skill requirement, plus 18 hours of dissertation credit (ELdr 799R); 12 hours outside the college. Prior credit earned in a recognized advanced degree program may apply on the recommendation of advisory committee.
- II. Required courses: Consult department for major core courses.
- III. Study list: Should be submitted by the end of the first semester.
- IV. Credit limitations: ELdr 515R or extension courses are not accepted toward degree programs.
- V. Minor: 18 hours in a department outside the College of Education.
- VI. Residence: Two consecutive full-time semesters (9 hours each semester) on the BYU Provo campus.
- VII. Skill requirement: Consult department.
- VIII. Dissertation: A dissertation is required. The purpose of the PhD is to expand, in creative ways, the theoretical knowledge base of the educational leadership field. The dissertation should reflect such emphasis. The dissertation carries 18 credit hours and presumes advanced research expertise. It may not be undertaken until successful completion of

the comprehensive examination and approval of the dissertation prospectus by the student's advisory committee and department chair. The dissertation and prospectus are different in nature from course work per se; therefore, performance on these tasks may not correlate highly with performance in individual courses.

IX. Examinations:

- A. Written and oral comprehensive examination.
- B. Oral defense of dissertation.

Minimum registration: Following admission to the doctoral program, students will be expected to work continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 hours of approved program credit during each academic year (September 1 to August 31).

Educational Leadership Graduate Courses

Note: ELdr 515R is for certification purposes only and is listed in the BYU Undergraduate Catalog.

517. Professional and Scholarly Writing in Education. (2)

Refinement of skills for professional writing efforts, e.g., memoranda, reports, articles, theses, etc. Practice and corrective feedback.

532. Gifted and Talented: Programs. (2)

Examination of a variety of programs for gifted and talented students in the schools.

535. Gifted and Talented: Curriculum and Instruction. (2)

Designing curriculum and instruction for gifted and talented students in the schools.

537. Gifted and Talented: Creativity. (2)

Nature of creativity and approaches to nurturing it.

539R. Gifted and Talented: Practicum. (1-4)

Experience in a school setting under the direction of college faculty.

600. Stewardship: The Human and Organizational Domains. (2)

Leadership behavior in educational institutions.

602. Stewardship: Educational Reform and the Schools. (2)

Change processes in educational institutions.

609. The School Principal. (2)

Prerequisite: concurrent registration in ELdr 611.

Work of the principal in public schools: instructional leadership, personnel relationships, and administration.

611. Improvement of School Practice. (1)

Prerequisite: concurrent registration in ELdr 609.

The administrative work of the principal.

614. Education of Diverse Populations. (2)

Problems, issues, and programs related to students with varying abilities, interests, and needs.

620. Educational Finance. (2)

Theory, principles, and general practices of public school finances; equalization and finance problems.

622. The Law and Education. (2)

Evolution of American law and its application to American educational systems. Fundamental sources and principles of the law, the judicial structure, and key court cases affecting education in state and federal questions.

628. Curriculum Development and Supervision of Instruction. (2)

Prerequisite: concurrent registration in ELdr 629.

Principles and procedures in curriculum development; role of the supervisor in improving instruction and staff performance.

629. Curriculum Development and Supervision of Instruction. (1)

Prerequisite: concurrent registration in ELdr 628.

Understanding school curriculum and supervision of instruction.

631. Teaching and Learning: Research and Practice. (2)

Teaching and learning from the perspectives of research, practice, and theory.

632R. Field Practicum. (2-6)

Prerequisite: 6 hours required for administrative certificate; 2 hours required for MED degree.

Working with a school administrator as a supervised intern.

634R. Doctoral Internship. (1-6)

Prerequisite: ELdr 610, 612, 628.

Field experience in state office and local school districts, in community colleges, and in other agencies.

655. Social and Cultural Foundations of Education. (2)

Social conditions in American society that have major implications for education and the functioning of the school leader.

658. Political Aspects of Education. (2)

Understanding processes and institutions in building support for education; associated issues.

659. Contemporary Issues in Education. (2)

Educational issues in American schools: elementary through college.

660. Stress Management. (2)

Understanding and coping with stress and distress in leadership. Effectively using time in multiple roles in society.

665. Evaluation and Assessment in Education. (2)

Prerequisite: ELdr 663, 664.

Nature, purpose, and function of the evaluation of educational programs.

668. History and Philosophy of Education. (2)

Educational thought in world cultures; philosophies—humanism, pragmatism, etc.—that influence American education.

670R. Workshops in Educational Leadership. (1-3)

Prerequisite: ELdr 610, 612.

671. Educational Research. (3)

Techniques of research in educational settings.

674. Technology Applications in Education. (2)

Administrative and instructional applications of technology in public schools; evaluating software and commercially available materials.

684. Business Administration in Education. (2)

Administering details of executive business affairs in educational institutions.

687. School Personnel Administration. (2)

Role of the school district in public education; Administrative management, negotiations, and communication systems.

688. Educational Facilities. (2)

School planning, site selection, master planning, writing educational specifications, functions of architects, supervising and accepting buildings, relationships with governmental agencies, passing bond elections.

691R. Doctoral Seminar. (1–3)

Prerequisite: department's consent.

694R. Independent Study. (1–3)

Prerequisite: department's consent if more than one registration desired.

Study experience in an area of specialization under direction of a faculty member.

695R. Independent Research. (1–3)

Prerequisite: instructor's consent; department's consent if more than one registration desired.

Individual research study or project under the direction of a faculty member.

696R. Professional Education Project. (1–3)

A disciplined experience in observing, gathering, interpreting, and reporting data.

700. Educational Leadership. (2)

Examination of theories of leadership in educational settings.

702. Educational Change. (2)

Understanding the principles emerging from research on educational change.

720. The Superintendency and Educational Policy. (2)

Role of the school superintendent in developing school policy.

731. Principles of Curriculum Development. (2)

Prerequisite: ELdr 628 or instructor's consent.

Curriculum planning and design and its implementation in schools.

740. Adult and Continuing Education. (2)

Principles, concepts, procedures, and relationships in administering adult and continuing education.

761. The Community College. (2)

History and philosophy of the American two-year college, including major trends and prospects.

762. College and University in America. (2)

Historical review of the challenges facing higher educational administration in today's colleges and universities.

765. Administration and Governance in Higher Education. (2)

Organization and administration of colleges and universities.

775. Data Analysis. (2)

Principles and practices in statistical analysis.

776. Evaluating Research. (2)

Prerequisite: ELdr 671 or equivalent.

Techniques of critical review in educational research.

780. Social Policy and Economic Aspects of Education. (2)

Prerequisite: ELdr 622 or instructor's consent.

Policy development in the schools and economic considerations for financing education.

782. Constitutional Law and Education. (2)

Prerequisite: ELdr 622 or instructor's consent.

Impact of the Constitution on education in America; cases under constitutional law that have influenced policy and practice in the educational system.

788R. Doctoral Practicum. (2–6)

Design and implementation of on-site research. Development of a prospectus for the doctorate under the direction of a faculty member.

790R. Educational Leadership in American Schools.

(1–4)

Seminar arrangement for students to interact with professional educators on a variety of topics in education.

795. Research and Reporting Techniques for Doctoral Dissertation. (2)

Research designs for planning and conducting research for the doctoral dissertation using survey, inferential, and experimental methods.

799R. Dissertation. (1–18)

Prerequisite: ELdr 795.

Educational Psychology

Chair: Ronald D. Bingham, 320-A MCKB, 378-4839

Graduate Coordinator: Darwin F. Gale, 320-H MCKB,

378-6175

Faculty/Specialties

Professors

Bingham, Ronald D. (1971) PhD, Pennsylvania State University, 1970. Counseling, Mental Health.

Gale, Darwin F. (1969) EdD, Brigham Young University, 1967. Learning Theory, Motivation, Perception.

Harris, Richard W. (1982) PhD, Purdue University, 1978.

Hearing Science, Perception.

Heaps, Richard A. (1970) PhD, University of Utah, 1970. Counseling.

Hilton, Laurence M. (1985) PhD, Northwestern University, 1973. Communication Sciences and Disorders.

Ingram, Gregg F. (1975) EdD, University of Kentucky, 1974. Special Education and Instructional Systems.

Kramer, Gary L. (1982) PhD, Oregon State University, 1977. Educational Psychology.

- McPherson, David L. (1991) PhD, University of Washington, 1972. Audiology, Hearing Science, Electrophysiology.
- Thomas, Glen E. (1968) EdD, Colorado State College, 1968. Diagnostic Prescriptive Teaching for the Mentally Retarded.
- Ward, G. Robert (1981) PhD, Michigan State University, 1965. Counseling.

Associate Professors

- Brinton, Bonnie (1991) PhD, University of Utah, 1981. Child Language Development and Language Disorders.
- Channell, Ron W. (1983) PhD, University of Utah, 1983. Developmental Psycholinguistics.
- Egan, M. Winston (1993) PhD, University of Florida, 1974. Special Education, Behavior Disorders.
- Fujiki, Martin (1991) PhD, University of Utah, 1980. Normal Language Acquisition and Language Development.
- Isakson, Richard L. (1983) PhD, Cornell University, 1975. Counseling.
- Johnson, Richard W. (1968) PhD, Brigham Young University, 1968. Counseling.
- Mouritsen, Maren M. (1978) EdD, Columbia University, 1979. Educational Psychology.
- Rowe, Fred A. (1972) EdD, Arizona State University, 1975. Career Guidance.
- Todd, Sally M. (1973) PhD, University of Arizona, 1973. Educational Psychology.
- Winward, Edward J. (1959) PhD, University of Missouri, Rolla, 1966. Tests and Measurements.
- Young, James R. (1970) PhD, George Peabody, 1970. Educational Psychology.

Assistant Professors

- Allred, Keith W. (1991) PhD, Vanderbilt University, 1988. Special Education.
- Brown, Gail W. (1991) PhD, University of Utah, 1988. School Psychology.
- Hanks, Wendy (1992) PhD, Wichita State University, 1985. Pediatric and Rehabilitative Audiology.
- Richards, P. Scott (1990) PhD, University of Minnesota, 1982. Counseling.

Graduate Degrees and Programs

- MS Audiology
- MS Speech-Language Pathology
- MS Special Education
- MS Counseling and Guidance
- MS School Psychology
- PhD Counseling Psychology

Degree and Program Requirements

- MS Audiology**
- MS Speech-Language Pathology**
- MS Special Education**

A master's degree in audiology or speech-language pathology consists of professional training and attainment of competencies that qualify graduates for admission to doctoral study, licensure, certification, and professional employment.

The goal of the special education master of science degree program is to prepare professionals in special education for leadership positions in public schools. They will gain knowledge and skills in research, curriculum design, and evaluation of programs serving exceptional populations.

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
 Fall —February 15 (U.S. and international)
 Spring —February 15 (U.S. and international)
 Summer —February 15 (U.S. and international)
 Audiology and speech-language pathology
 admit fall semester and spring and summer terms. School psychology admits fall semester only. Special education admits fall semester and summer term.

- B. Entrance examination: GRE General Test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores.

- C. Because of the nature of the clinical professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.

- II. Prerequisite: Appropriate educational and professional experience as determined by major area of study.

Requirements for Degree

- I. Credit hours (36–42): Depending on area of emphasis, minimum of 36–42 hours of approved course work, including elementary-level statistics (3 hours), research (3 hours), and thesis credit (6 hours).
- II. Required courses: Consult departmental specialty area.
- III. Minor (optional): Approved by advisory committee.
- IV. Residence: At least one full semester's registration (9 credit hours minimum) must be completed on the BYU Provo campus.
- V. Thesis.
- VI. Examinations:
- A. Written comprehensive and/or oral examination.
 - B. Oral defense of thesis.

Note: EPsy 581R, 582R, 585R, 586R all require a \$40 fee in addition to tuition.

MS Counseling and Guidance

MS School Psychology

The 48-hour program in counseling and guidance provides a series of courses and experiences to promote students' knowledge, skill, and scholarship in such areas as (a) individual and group counseling, (b) assessment, (c) career development, (d) leadership, and (e) research and evaluation. Students may emphasize counseling in either school or agency settings or both. The majority of school counselors are employed at the secondary level, but some seek positions in elementary schools. Others work in college counseling or career centers, or in such student

personnel positions as placement, housing, admissions, student government, financial aid, etc. Graduates emphasizing community agency counseling find employment as counselors in such agencies as mental health, family services, substance abuse treatment, career guidance, criminal justice systems, protective services, industry, or private practice. Often these counselors complete 60 semester hours of course work and internship to qualify for professional counselor licensure in states that have passed counselor licensure legislation.

The School Psychology Program is a 66-semester-hour interdepartmental program cosponsored by the Educational Psychology and the Psychology departments and administered by Educational Psychology. During the first year students complete a 38-semester-hour master of science degree in educational psychology. At the completion of the MS degree program, students continue for an additional 28-semester-hour specialist certification program to qualify for state endorsement as a school psychologist. This second year includes a paid internship in a school setting, during which time students return to campus one day per week for course work. The program requires a project. Employment opportunities in the schools are plentiful. For more detailed information, refer to the school psychology handout (available at 328 MCKB) or contact the School Psychology Program coordinator at 328 MCKB, BYU, Provo, UT 84602, telephone (801) 378-3857.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
 - B. Entrance examination: GRE General Test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores.
 - C. Because of the nature of the counseling and psychology professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.
- II. Prerequisite: Appropriate educational and professional experience as determined by major area of study. Adequate background in education and/or psychology; undergraduate major in one or the other is preferred but not necessary.

Requirements for Degree

- I. Credit hours (38–48): Depending on area of specialty, minimum of 38–48 hours of approved course work including research, practicum, internship, and project paper or thesis.
- II. Required courses: Consult department program documents.
- III. Minor (optional): Approved by advisory committee.
- IV. Residence: At least one full semester's registration (9 credit hours minimum) must be completed on the BYU Provo campus.
- V. Project paper or thesis
- VI. Examinations:
 - A. Written comprehensive and/or oral examination.

- B. Oral defense of thesis or project.
- VII. Internship (see department program documents for specifics). Note: EPsy 680R (school psychology) requires an \$80 fee.

PhD Counseling Psychology

The PhD in counseling psychology is primarily psychological in nature and is based upon the scientist-practitioner model of training as recommended by the American Counseling Association and the American Psychological Association. The scientist-practitioner model is an integrated approach to training that acknowledges the interdependence of theory, research, and practice. The counseling psychology program at BYU emphasizes the educational, developmental, and preventive functions of counseling psychologists and counselor educators. Students are also prepared to intervene remedially with people who are experiencing abnormal development and psychopathology. Graduates of the program serve as counseling psychologists in colleges, university counseling centers, schools, private practice, and private and public agencies as well as counselor educators in university academic departments.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
 - B. Entrance examination: GRE General Test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores.
 - C. Because of the nature of the counseling and psychology professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.
- II. Prerequisite:
 - A. Master's degree in counseling or psychology, or in an approved closely related field.
 - B. Appropriate professional experience as determined by major area of study.

Requirements for Degree

- I. Credit hours: Minimum of 94 hours, plus skill requirements.
- II. Required courses: Consult department program documents.
- III. Minor (optional): Approved by advisory committee.
- IV. Residence: Minimum of two consecutive full-time semesters beyond the master's degree (minimum 9 credit hours each semester) on the BYU Provo campus.
- V. Skill requirement: Consult department.
- VI. Predoctoral internship (2,000 hours).
- VII. Dissertation:
Examinations:
 - A. Written comprehensive examination at completion of course work.
 - B. Oral defense of dissertation.

General Educational Psychology Graduate Courses

Note: EPsy 514R and 515R courses are for certification purposes only and are listed in the BYU Undergraduate Catalog. No graduate degree credit is given for 514R; 515R credit may count toward a graduate degree if prior approval is obtained from advisory committee.

501. Test and Measurement Theory. (3) F, W, Su
Independent Study also; no graduate degree credit given for Independent Study.

Basic test and measurement theories. Types of tests. Reliability and validity. Standardization and test construction.

502. Child and Adolescent Psychopathology and Interventions in Schools. (3) W

Role of school psychologists and their functions in various settings. Indirect service delivery/consultation emphasized.

601. Advanced Educational Psychology. (3) F, W, Su

General educational psychology: learning theory, motivation, perception, development.

672. Empirical Inquiry in Education. (3) F, W, Su

Prerequisite: Stat 552 or equivalent.

Introduction to empirical research in education. Emphasizes designing, conducting, analyzing, reporting, and evaluating empirical studies in education.

680R. Internship. (1–6) F, W, Sp, Su

Prerequisite: department's consent.

690R. Seminar. (1–3) F, W, Sp, Su

Check current class schedule for seminar topics.

692R. Advanced Topics. (1–3) F, W, Sp, Su

693R. Directed Individual Study. (1–3) F, W, Sp, Su

Prerequisite: instructor's consent.

697R. Special Projects. (1–6) F, W, Sp, Su

Prerequisite: Stat 552 and EPsy 672 or equivalent.

699R. Master's Thesis. (1–6) F, W, Sp, Su

Counseling Graduate Courses

546. Helping Relationships: Basic Concepts and Skills. (1–3) F, W

Basic interviewing and helping skills. For students interested in professional, paraprofessional, peer, or lay counseling.

600. Introduction to Counseling and Guidance Services. (3)

Independent Study also; no graduate degree credit given for Independent Study.

Introduction to the counseling profession: history, philosophy, issues, trends, and current status. Role of counselor in school and community agency settings.

606. Psychoeducational Foundations of Counseling. (3) F, W

Prerequisite: admission to graduate study in educational psychology.

Fundamental concepts and theories of motivation, human development, learning, personality, and abnormal psychology as they relate to counseling.

644. Career Development and Counseling. (3)

Theories of career development and choice with consideration of special populations. Application to life span and career counseling.

645. Appraisal Theory and Practice in Counseling. (3) F

Testing and appraisal theory. Administration and interpretation of group standardized tests: personality, interest, relationship, achievement, ability, behavior, and career.

646. Counseling Theory and Interventions. (3) F

Various theories of counseling, current research, and accepted practices.

647. Individual Intelligence Assessment in Education. (3) F, W

Prerequisite: EPsy 625 and /or 645; instructor's consent.

Theory and experience in administering and interpreting individual intelligence tests in an educational setting.

648. Group Counseling and Interventions. (3) W

Prerequisite: EPsy 646 or instructor's consent.

Various approaches to group counseling. Developing and participating in structured group experiences.

649. Human Growth and Development. (3) F

Psychoeducational aspects of developmental theory across the life span, including psychosocial, moral, ego, cognitive, faith and identity. Developmental implications in the counseling process.

650. Leadership in Counseling and Guidance. (3) Sp

Leadership theory; organizing, administering, and implementing counseling and pupil personnel services in schools and other settings.

651. Social and Multicultural Aspects of Counseling and Psychology. (3) W

Prerequisite: admission to graduate program in counseling and guidance, special education, school psychology, or counseling psychology.

Description of the basic ethnic cultures: aging, gender, religious and socio-economic traditions, and issues. Multicultural counseling, testing, and helping theories and skills.

654. Educational and Career Guidance. (3) W

Requirements for a resource center; knowledge of resources available in the community; an applied approach to career guidance.

655. Issues and Interventions in Counseling and Mental Health. (3) W

Human crises and addictive behaviors. Preventive, developmental, and remedial interventions.

656. Religious Values and Methods in Counseling and Psychotherapy. (3) Sp
Prerequisite: EPsy 646 or equivalent.

Religious values and spiritual perspectives, issues, and approaches in counseling and psychotherapy.

665. Career Assessment. (3) W

Applying testing and measurement theory in the areas of aptitudes, interests, and values in the counseling process.

678. Counseling Skills Practicum. (3) F

Observing counseling techniques in settings where counseling takes place. Practicing beginning counseling skills. Laboratory required.

679. Counseling and Guidance Practicum. (3) W

Prerequisite: EPsy 678; departmental approval of application and placement one semester in advance of registration.

Supervised beginning and intermediate counseling techniques and other responsibilities in school or community counseling settings. Laboratory required.

680R. Counseling and Guidance Internship. (2-6) F, W, Sp, Su

Prerequisite: EPsy 679; departmental approval of application; placement one semester in advance of registration.

Practicing individual and group skills, testing and other techniques, and responsibilities consistent with advanced master's students.

695R. Counseling Seminar. (1-3) F

701R. Doctoral Seminar. (1-2) F

Acquaints new doctoral students with policies and procedures of the department, university, and profession.

705. Preventive and Developmental Methods in Counseling Psychology. (3) W

Prerequisite: admission to PhD program in counseling psychology or instructor's consent.

Preventive and developmental interventions to enhance personal effectiveness; theory and practice in approaches to enhance wellness.

710. Ethics and Standards in Counseling Psychology. (3) F

Ethics and standards applied to counseling and psychology, including legal issues, licensing, and professionalism.

715. Diagnosis of Psychological Problems in Counseling. (3) Sp

Theory, diagnosis, and classification of emotional problems related to education, psychology, and counseling.

720. Fundamentals of Learning Theory and Cognitive Development. (3) Sp, Su Alt. year

Learning and cognitive developmental theories and their application to behavioral change.

725. Theory and Practice of Objective Personality Tests: Including MMPI. (3) W

Administering and interpreting the MMPI with relevant application and current research. Enrollment limited to doctoral students in counseling (or instructor's consent).

745. Advanced Counseling Theory. (3) F

Prerequisite: EPsy 646.

Various theoretical and practical approaches to counseling and therapy.

746R. Supervision Theory and Practice in Counseling. (3) W

Prerequisite: EPsy 680R and instructor's consent.

Theoretical approaches to the supervision of counseling; practice in supervising counselors-in-training.

748. Advanced Group Theory and Process. (3) W

Prerequisite: EPsy 648.

Advanced theory of groups.

750. Research Theory and Methods in Counseling Psychology. (3) W

Prerequisite: EPsy 672, Stat 552 or 501; admission to PhD program in counseling psychology.

Advanced counseling process and outcome research methods. Includes between groups, within-subjects experimental designs; quasi-experimental and times series designs; discovery-oriented, small N, and qualitative research strategies.

779R. Advanced Practicum in Counseling. (1-4) F, W, Sp, Su

Prerequisite: EPsy 680R; department's consent; placement one semester in advance of registration.

780R. Doctoral Clerkship in Counseling. (2-8) F, W, Sp, Su

Prerequisite: EPsy 779 and department's consent. Students must submit application for practicum one semester in advance of registration.

790R. Advanced Seminar. (1-4) F

Prerequisite: department's consent.

799R. Doctoral Dissertation. (1-9) F, W, Sp, Su

Prerequisite: completion of skill requirements.

Formal report and defense of a substantive research topic designed to make an original contribution to knowledge in the field. Only 3 hours of 799R may be used in establishing residency requirements.

Special Education Graduate Courses

503. Education of Individuals with Mild and Moderate Disabilities. (3) F, W, Su

Prerequisite: EPsy 405, 480R, and concurrent registration in EPsy 586R.

Development, implementation, and evaluation of instructional programs for children with mild to moderate learning difficulties.

505. Psycho-educational Implications of Exceptionality. (1-3) F

506R. Curriculum and Technology in Special Education. (1-3) F, W, Sp, Su

510. Education of Individuals with Emotional and Behavioral Disabilities. (3) F, W, Su
Prerequisite: EPsy 204, 305, instructor's consent, and prior application

Educational implications of classification and characteristics of children with emotional and behavioral problems.

511. Curriculum for Individuals with Emotional and Behavioral Disabilities. (3) W

Prerequisite: EPsy 510 and instructor's consent.

Instructional strategies for children with emotional and/or behavioral disabilities.

518. Education of the Gifted and Talented. (2) F, Su

Various approaches to educating the gifted and talented.

519. Education of Individuals with Severe and Profound Disabilities. (1-3) F, W, Su

Prerequisite: instructor's consent, EPsy 102R, 204, 205, 305.

Independent Study also; no graduate degree credit given for Independent Study.

Educational implications in the identification and classification of individuals with severe and profound disabilities.

520. Curriculum for Individuals with Mental Retardation. (1-3) W, Su

Prerequisite: EPsy 519.

Independent Study also; no graduate degree credit given for Independent Study.

Instructional programs for the mentally retarded.

521. Curriculum for Individuals with Severe and Profound Disabilities. (1-3) W, Sp

Prerequisite: EPsy 205, 305, 380R, 519.

Instructional programs for individuals with severe and profound disabilities.

525. Education of Students with Learning Disabilities. (3) F, W, Sp

Prerequisite: instructor's consent.

526. Curriculum for Students with Learning Disabilities. (3) W, Sp

Prerequisite: EPsy 525.

Organization of educational programs, curriculum development, and teaching methods for children with learning disabilities.

580R. Directed Observation in the Schools. (1-3) F, W, Sp, Su

Prerequisite: instructor's consent.

581R. Practicum: Individuals with Mental Retardation. (1-8) F, W, Sp, Su

Prerequisite: EPsy 520, departmental approval of application, and placement one semester in advance of registration. Fee.

582R. Practicum: Individuals with Emotional and Behavioral Disabilities. (1-8) F, W, Su

Prerequisite: instructor's consent, EPsy 511, and prior application. Fee.

584R. Practicum: Individuals with Learning Disabilities. (2-8) F, W, Sp

Prerequisite: EPsy 526, departmental approval of application, and placement one semester in advance of registration. Fee.

586R. Practicum: Individuals with Mild and Moderate Disabilities. (1-8) F, W, Su

Prerequisite: EPsy 503, departmental approval of application, and placement one semester in advance of registration. Fee.

588R. Practicum: Individuals with Severe and Profound Disabilities. (1-8) W, Sp

Prerequisite: concurrent registration in EPsy 521, departmental approval of application, and placement one semester in advance of registration.

603. Guidance and Counseling of the Exceptional Child. (3) W, Su

604. Special Education Services in Public Schools. (2) Sp, Su

625R. Psychological-Educational Assessment of Learning. (3) F, W, Sp, Su

Prerequisite: instructor's consent.

626. Advanced Curriculum in Special Education. (3) W, Su

Prerequisite: EPsy 205 or equivalent.

680R. Internship. (2-6) F, W, Sp, Su

Prerequisite: departmental approval of application; placement one semester in advance of registration.

Practicing individual and group skills, testing, and other techniques and responsibilities consistent with advanced master's students.

690R. Seminar in Special Education. (1-3) F, W, Sp, Su

School Psychology Graduate Courses

502. Child and Adolescent Psychopathology and Intervention in Schools. (3) W

610. School Psychology Issues and Consultation. (3) F

Etiology and diagnosis of dysfunctional behavior and maladjustment with interventions for school-age children; models and methods of consultation with teachers, parents, and professionals.

680R. Internship. (2-6) F, W, Sp

Prerequisite: departmental approval of application; placement one semester in advance of registration. Must be taken concurrently with 690R seminar.

Practicing individual and group skills, testing, and other techniques and responsibilities consistent with advanced master's students.

690R. Seminar in School Psychology. (1-3) F, W

Discussion of problems and issues in school psychology. Must be taken concurrently with 680R internship.

Audiology Graduate Courses

500. Clinical Data Acquisition and Analysis. (3) F, Alt. term
Prerequisite: Stat 222.

Research methods in audiology and speech language pathology; applying statistical techniques; professional literature and writing.

544. Advanced Hearing Science. (3) Alt. term
Hearing anatomy, physiology, and science.

616. Acoustic Impedance Measures. (2) F
Middle ear measurements and special test applications.

617. Auditory Physiological Tests 1. (3) F
Introduction: electroneurostigmography; evoked potential testing.

618. Auditory Physiological Tests 2. (2) W
Advanced procedures: electroneurostigmography; evoked potentials.

638. Advanced Hearing Tests and Measures. (3) F
Advanced audiometric procedures assessing impaired hearing.

639. Community and Industrial Audiology. (2) Alt. term
Hearing problems in industry; legal implications.

641. Hearing Aids. (3) F
Assessing hearing aid performance; the art of fitting hearing aids.

643. Adult Aural Rehabilitation. (2) W
Rehabilitative audiology for hearing-impaired adults.

671. Instrumentation-Calibration. (2) Alt. term
Calibration of audiological instruments.

673. Pathologies of the Auditory Mechanism. (3) W
Prerequisite: EPsy 334, 438.
Hearing disorders of outer, middle, and inner ear and central auditory pathway.

680R. Internship. (2–6) F, W, Sp, Su
Prerequisite: instructor's consent four weeks in advance of registration.

Practicing individual and group skills, testing, and other techniques and responsibilities consistent with advanced master's students.

685R. Practicum in Clinical Audiology. (1–8) F, W, Sp, Su
Prerequisite: instructor's consent.

690R. Seminar in Audiology. (1–3) Alt. term

694R. Special Projects in Clinical Audiology. (1–3) F, W, Sp, Su
Prerequisite: instructor's consent.

699R. Master's Thesis. (1–6) F, W, Sp, Su

Speech-Language Pathology Graduate Courses

A full undergraduate program in speech-language pathology must be completed before taking any of the following graduate courses, or additional prerequisite courses must be taken.

500. Clinical Data Acquisition and Analysis. (3) F, Alt. term

Prerequisite: Stat 222.

Research methods in audiology and speech language pathology; applying statistical techniques; professional literature and writing.

573. Aphasia. (3) W

574. Communicative Disorders of Individuals with Severe Disabilities. (3) F

575. Motor Speech Disorders. (3) F

Neuropathology, symptomatology, clinical assessment, and treatment of adult motor speech disorders.

576. Computers in Speech-Language Pathology and Audiology. W (1)

Characteristics of software and specialized hardware applied to computational study and interventions with language, speech, and hearing.

630. Theories of Child Language Acquisition. (3) W
Prerequisite: EPsy 330, 575.

633. Dysphagia and Head Trauma Management. (2) Alt. term

Acquired swallowing and eating disorders, rehabilitation of dysphagia, and traumatic brain injury and cognitive rehabilitation therapy.

662. Maxillofacial and Related Disorders of Human Communication. (2) Alt. term

680R. Internship. (3) F, W, Sp, Su

685R. Practicum in Speech-Language Pathology. (1–8) F, W, Sp, Su
Prerequisite: instructor's consent.

690R. Seminar in Language Disorders. (3) Alt. term

690R. Seminar in Speech Pathology. (3) Alt. term

694R. Special Projects in Speech-Language Pathology. (1–3) F, W, Alt. term

699R. Thesis. (1–6) F, W, Sp, Su

Electrical and Computer Engineering

Chair: Brent E. Nelson, 459 CB, 378-4012

Graduate Coordinator: Richard H. Selfridge, 454 CB, 378-6313

Faculty/Specialties

Professors

Bowman, Lawrence S. (1967) PhD, University of Utah, 1964. Computers, Microwave Semiconductors.

Chabries, Douglas M. (1978) PhD, Brown University, 1970. Digital Signal Processing, Adaptive Filtering, Image and Sonar Processing.

Christiansen, Richard (1978) PhD, University of Utah, 1976. Digital Signal Processing, Image Processing, Neural Networks, Communication and Information Theory, Pattern Recognition.

Comer, David John (1981) PhD, Washington State University, 1966. Robotic Vision Systems, Microprocessor Applications.

Humpherys, Deverl S. (1964) PhD, University of Illinois, 1963. Electronics and Circuit Theory.

Miner, Gayle F. (1960) PhD, University of California, Berkeley, 1969. Electromagnetic Theory, Fiber Optics, Data Acquisition.

Woodbury, Richard C. (1959) PhD, Stanford University, 1965. Semiconductor and Magnetic Devices.

Associate Professors

Archibald, James K. (1987) PhD, University of Washington, 1987. Computer Architecture, Parallel Processing.

Bearnsen, Leroy Wood (1972) PhD, Auburn University, 1970. Computer Communication, Error Correction, Networking.

Nelson, Brent E. (1984) PhD, University of Utah, 1984. VLSI Design, Computer Systems Design.

Salmon, Linton G. (1990) PhD, Cornell University, 1983. Integrated Circuit Processing and Modeling, High-Speed Packaging, III-V Devices.

Selfridge, Richard H. (1987) PhD, University of California, Davis, 1984. Fiber and Integrated Optics, Electromagnetics, Lasers.

Stirling, Wynn (1984) PhD, Stanford University, 1983. Linear System Theory, Estimation and Detection Theory, Communications and Information Theory.

Assistant Professors

Arnold, David V. (1992) PhD, Massachusetts Institute of Technology, 1992. Electromagnetic Wave Theory.

Frost, Richard L. (1987) PhD, University of Utah, 1979. Digital Signal Processing, Information Theory, Image Processing, Neural Networks.

Hutchings, Brad L. (1992) PhD, University of Utah, 1992. VLSI Design, Computer Systems Design.

Jeffs, Brian D. (1990) PhD, University of Southern California, 1989. Digital Signal Processing, Digital Image Processing, Biomedical Imaging.

Long, David G. (1990) PhD, University of Southern California, 1989. Digital Signal Processing, Estimation Theory, Radar.

Rice, Michael D. (1991) PhD, Georgia Institute of Technology, 1991. Communications Theory, Error-correcting Codes.

Swindlehurst, Arnold Lee (1990) PhD, Stanford University, 1991. Detection and Estimation Theory, Linear Systems and Control.

Graduate Degrees and Programs

MS Electrical Engineering

MEM Engineering Management

PhD Engineering

Eligibility for Financial Assistance

Students on probation are not eligible for financial assistance in any form from the Electrical and Computer Engineering Department.

For additional information on department procedures, requirements, academic standards and expectations, scholarships, and financial assistance, consult the department graduate secretary.

Degree and Program Requirements

MS Electrical Engineering

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:

Fall	—February 15 (financial aid consideration—U.S. and international)
	—February 28 (international)
	—May 15 (U.S.)
- Winter —June 30 (international)
- September 15 (U.S.)
- Spring —October 31 (international)
- January 15 (U.S.)

B. Entrance examination: The GRE General Test is required of applicants with degrees from institutions that have not been accredited by ABET.

- II. Prerequisite: BS degree in electrical and/or computer engineering from an ABET-accredited institution with minimum GPA of 3.0 for last 60 hours and for all technical course work (such as mathematics, physics, engineering), or, with department consent, a BS degree in an allied discipline from an accredited institution or a BS degree in electrical and/or computer engineering from a non-accredited institution with a minimum GPA of 3.2 for last 60 hours and for all technical course work. Applicants with a baccalaureate degree in an allied discipline must have completed a minimum of 36 credit hours in mathematics, physics, computer science, and engineering before being considered for admission. Interested students may consult the department secretary for a list of required courses.
- III. Provisional admission: Applicants may be admitted provisionally but will generally be required to complete remedial work. Students admitted provisionally who fail to meet all the provisions of acceptance by the end of their first semester or term are automatically placed on departmental probation and will have one semester to clear the probationary status or their graduate degree program will be terminated.

Requirements for Degree

- I. Credit hours: Minimum 34 credit hours.
- II. Required courses: (Note: Although the following courses are allowed, students must receive the approval of the graduate advisory committee and the graduate coordinator before any of the courses can apply toward their graduate degree.)
 - A. ECEn 691R (a minimum of two semesters).
 - B. Theoretical foundation courses (a minimum of 6 hours). A master's degree implies a rigorous mathematical understanding. The department requires the course of study to include classes devoted to the theoretical foundations and appropriate formalisms of the student's specialty. An advisor will help select these classes, typically from mathematics, physics, statistics, or computer science. Only classes at or above the 300 level can be considered for acceptance.

- C. Specialization courses (a minimum of 18 hours). The MS degree also implies mastery of a body of knowledge and practice. The course of study should have a well-defined focus aimed at producing competence in all areas of interest. All 500- and 600-level courses in the Electrical and Computer Engineering Department are acceptable for an MS degree. Courses from other departments may also be acceptable but will need approval from an advisor and the graduate coordinator.
- D. Thesis option: 6–9 hours of ECEn 699R.
- III. Study list: The graduate study list must be submitted by the end of the fourth week of the entry semester. Failure to submit the study list on time will cause the student's registration to be placed on hold for the succeeding semester or term.
- IV. Residence: See Residence Requirements on page 38.
- V. Examinations:
- A. Thesis program—oral defense of thesis.
 - B. Nonthesis program—final comprehensive written examination over master's course work.
- VI. Thesis (for thesis option candidates).
- VII. Grades: No class on an approved study list may be repeated to raise the grade. The first grade received in the class will be used in computing the graduate GPA. Once a course listed on an approved study list has been taken, the course may not be removed from the study list.

MEM Engineering Management

See page 109 of this catalog for a description of the interdisciplinary program in engineering management. MEM students who wish to take classes in the Electrical and Computer Engineering Department should consult the department graduate coordinator.

PhD Engineering

Admission and Entry

- I. Semesters of entry and application deadlines:
- | | |
|--------|--|
| Fall | —February 15 (Financial aid consideration) |
| | —U.S. and international) |
| | —February 28 (international) |
| | —May 15 (U.S.) |
| Winter | —June 30 (international) |
| | —September 15 (U.S.) |
| Spring | —October 31 (international) |
| | —January 15 (U.S.) |
- II. Entrance examinations:
- A. None for applicants who hold a BS or MS degree from U.S. or Canadian schools.
 - B. International students must submit GRE General Test and advanced engineering subject test as well as TOEFL scores (577 minimum).
- III. Prerequisite: BS degree (or equivalent) in electrical and/or computer engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a minimum GPA of 3.0 in the last 60 hours of technical and scientific course work. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree

- I. Credit hours: Minimum of 68 semester hours, at least 50 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (ECEn 799R).
- A. Candidates without a master's degree: Of the 50 hours, a minimum of 38 hours must be graduate-level courses. At least 12 hours of the 50 must be advanced mathematics, statistics, or science (a portion of which may be upper-division undergraduate level with specific departmental approval), and a minimum of 18 hours of dissertation (ECEn 799R).
- B. Candidates with a master's degree: With advisory approval, up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics, statistics, or science with departmental approval.
- II. Required courses: ECEn 791R each semester of residence (only 1 credit hour may apply toward the minimum semester hours required [68]).
- III. Electives: Determined in consultation with advisory committee.
- IV. Study list: The graduate study list must be submitted during the first semester of doctoral study.
- V. Residence: See Residence Requirements on page 38.
- VI. Comprehensive qualifying examination: Students must take and pass a written comprehensive qualifying examination based on graduate course work.
- VII. At the option of the department, an oral research report on an assigned topic may be required within one year of passing the comprehensive qualifying examination. Upon presentation of an acceptable report, the student is advanced to candidacy for the doctoral degree.
- VIII. Prospectus: Students must submit and successfully defend a written prospectus on their proposed dissertation research topic at least one year before completion of the degree.
- IX. Dissertation.
- X. Oral defense of dissertation.
- XI. Maximum completion time: All course work for the PhD degree beyond that used for the MS degree must be completed within seven years.

Electrical and Computer Engineering Graduate Courses

510. (ECEn-Stat 545) Stochastic Processes. (3)

Prerequisite: Stat 421 or 520.

Review of elementary probability: expectation, characteristic functions, limit theorems. Introductory random processes: definitions and properties, covariance and spectral density, time average, stationarity, ergodicity, linear system relations, mean square estimation, Markov processes.

511. Introduction to Linear System Theory. (3)

Prerequisite: ECEn 411.

Finite-dimensional linear systems. State variable realizations, canonical forms, controllability, observability, minimality. Time and frequency domain design of controllers and observers.

512. Active and Passive Filter Design. (3)

Prerequisite: ECEn 314 or 315.

Design and frequency response characteristics of active and passive filters with emphasis on applications to signal processing.

513. Signal Analysis in Linear Systems. (3)

Prerequisite: ECEn 314 or graduate standing.

Continuous and discrete signals in linear systems, using Laplace, Fourier, and Z-transforms. Sampling, simulation, analog and discrete filters, FFT, windowing, and signal reconstruction.

514. Digital Signal Processing Laboratory 1. (1)

Prerequisite: ECEn 315 or concurrent registration.

Testing signal processing algorithms and concepts using digital computer. Discrete convolution, DFT, and digital filters.

515. Data Acquisition Systems. (3)

Prerequisite: ECEn 313; ECEn 314 or 315.

Components and their characteristics required to convert physical variables to digital data. Relationship between digital data word bit size and component characteristics.

516. Adaptive Processing. (2)

Prerequisite: ECEn 315.

Adaptive digital filter theory, LMS adaptive algorithms, applications to learning filters, noise cancellation, and adaptive antenna arrays.

517. Digital Filters and Signal Processing. (3)

Prerequisite: Math 322 or 332, ECEn 315 or 513; concurrent registration in ECEn 510.

Digital filters and their application to signal processing.

518. Digital Signal Processing Laboratory 2. (1)

Prerequisite: ECEn 517 or concurrent registration.

Advanced laboratory experience in computer processing of digital signals and signals in discrete format.

519. Digital Image Processing. (3)

Prerequisite: ECEn 315 or 513; ECEn 510.

Digital processing techniques for two-dimensional scene analysis, classification feature enhancement, contrast enhancement deblurring, data compression, etc.

520. Error-correcting Codes. (3)

Prerequisite: ECEn 324.

Methods, costs, and payoffs of various codes for correcting errors in digital systems.

521. Theoretical Foundations of Computing. (3)

Prerequisite: CS 232, 344, computer programming ability.

Introduction to finite automata, formal grammars, Turing machines, algorithm analysis, and computational complexity.

522R. Special Topics in Computer Systems. (1-3)

Prerequisite: instructor's consent.

523. Computer Network Queuing. (3)

Prerequisite: concurrent registration in ECEn 315; Stat 321 or 421.

Queuing concepts related to computer systems and networks, resource allocation, speed, service time. Applications of random variables and probability theory.

526. Local Computer Networks. (3)

Prerequisite: ECEn 327.

Local computer network coupling fundamentals.

528. Computer Systems Architecture. (3)

Prerequisite: ECEn 423.

Advanced topics in computer architecture and parallel processing.

529R. Advanced Computer System Design Lab. (3)

Prerequisite: ECEn 423, 451.

Lab experience in design and analysis of advanced computer systems.

542R. Special Topics in Electronics. (1-3)

Prerequisite: instructor's consent.

544. Digital Communication Theory. (3)

Prerequisite: ECEn 444, 510.

Theory and design of optimal digital communication systems with noise, matched filters, correlation detectors, convolution codes, sequential coding/decoding schemes, block coding, and spread spectrum.

545. Information and Coding Theory. (3)

Prerequisite: ECEn 314 or 315, Stat 421, ECEn 510.

Mathematical development of information and coding theory applied to communication and other stochastic processes.

546. Optical Communication Components and Systems. (3)

Prerequisite: ECEn 460.

Fiber-optic communication system components and their operating and performance characteristics.

547. Satellite Communications Systems. (3)

Prerequisite: ECEn 444.

Satellite communication system design including satellite transponders, microwave components, earth station hardware, link budgets, and analog and digital modulation formats.

550. Device Electronics for Integrated Circuits. (3)

Prerequisite: ECEn 450.

Semiconductor device analysis and simulation. Analog integrated circuit design.

551. VLSI Systems Design. (3)

Prerequisite: ECEn 451.

Design of structured circuit systems for very large-scale integrated semiconductor chips. Architecture of digital VLSI systems.

553. VLSI Process Technology. (3)

Prerequisite: senior or graduate standing in engineering or physical sciences.

Physical and chemical process steps used in fabricating very large-scale integrated circuits on monolithic silicon crystal.

555. VLSI Testing. (1)

Prerequisite: ECEn 451.

Testing of ICs designed previous semester in ECEn 451. Topics in VLSI-testable circuit designs.

560. Intermediate Electromagnetic Theory. (3)

Prerequisite: ECEn 460. Recommended: Math 323.

Application of electromagnetic theory to nonlinear and anisotropic materials and devices. Current mathematical techniques in field theory.

561. High-Frequency Communication Circuits. (4)

Prerequisite: ECEn 442, 460.

Circuits and RF techniques used in communication systems.

563. Antenna Theory. (3) Alt. even yr.

Prerequisite: ECEn 460.

Radiation, terminal, and distributed properties of antenna structures. Effects of lossy and ionized media on antenna performance. Noise temperature.

564. Radar Systems Performance. (3)

Prerequisite: ECEn 444, 460.

Performance and evaluation of various radar systems. Range equation, signal detection, ambiguity function, system configurations, and components.

568. Microwave Remote Sensing. (3)

Emphasis on space-borne remote sensing of earth's atmosphere, land, and oceans. Primary methods and applications for both active (Roden) and passive (radiometry) are covered.

593R. Special Topics in Electrical Engineering. (3)

Prerequisite: instructor's consent.

Topics vary. Recent developments in electrical engineering.

598R. Special Problems. (3)

Prerequisite: instructor's consent.

611. Optimal Control. (3)

Prerequisite: ECEn 511.

Optimization theory for controller design: finite and infinite horizon regulators, linear quadratic regulator design, terminal and path constraints, introduction to H-infinity theory.

612. System Identification. (3)

Prerequisite: ECEn 510, 511.

Parametric identification; identifiability theory, autoregressive/moving average models; nonparametric identification of linear and nonlinear systems using higher order statistics and Volterra and Wiener models; state space methods.

617. Advanced Digital Signal Processing. (3)

Prerequisite: ECEn 517; ECEn 510 or Stat 545.

Advanced topics in digital signal processing, including multirate DSP. Array processing and beam forming, model-based spectral estimation, advanced optimal filtering techniques, current research review.

619. Advanced Image Processing. (3)

Prerequisite: ECEn 517, 519; ECEn 510 or Stat 545.

Advanced topics in digital image processing, including reconstruction from projections, topics from computer vision, biomedical imaging, acoustic imaging, and current research review.

644. Pattern Recognition. (3)

Prerequisite: ECEn 315; Stat 321 or 421.

Decision surfaces and Bayesian theory applied to multidimensional pattern analysis and recognition with and without training data.

646. Optimal Estimation Theory. (3)

Prerequisite: ECEn 510, 544.

Optimal filtering techniques, including Wiener and Kalman filtering. Estimating signal parameters in noise.

661. Advanced Electromagnetic Fields. (3) Alt. odd yr.

Prerequisite: ECEn 560.

Physical interpretation of electromagnetic fields. Mathematical methods of solving boundary value and other field problems.

691R. Graduate Seminar. (0.5)

Technical presentations by graduate students, faculty members, and invited guests.

699R. Master's Thesis. (1-9)

Prerequisite: graduate standing and major professor's consent.

791R. Seminar for Doctoral Students. (0.5)

794R. Selected Topics in Electrical and Computer Engineering. (1-3)

797R. Research for Doctoral Students. (1-9)

799R. Doctoral Dissertation. (1-9)

Elementary Education

Chair: D. Ray Reutzel, 215-C MCKB, 378-4079

Graduate Coordinator: J. Lloyd Eldredge, 217-D MCKB, 378-2548

Faculty/Specialties

Professors

Allred, Ruel A. (1961) EdD, University of Oregon, 1965. Language Arts Education.

Baird, James E. (1973) PhD, University of Utah, 1973. Educational Administration.

Eldredge, J. Lloyd (1981) EdD, University of Utah, 1970. Reading Education.

Harris, R. Carl (1976) PhD, Pennsylvania State University, 1971. Educational Psychology and Partnerships.

Reutzel, D. Ray (1985) PhD, University of Wyoming, 1982. Language Arts and Research Design.

Tolman, Marvin N. (1975) EdD, Utah State University, 1975. Science Education.

Associate Professors

Chilcoat, George (Skip) (1989) EdD, Arizona State University, 1983. Social Studies Education and Curriculum Studies.

Cook, Paul F. (1977) PhD, Brigham Young University, 1968. Elementary Curriculum, Supervision, and Research Design.

Earle, Rodney S. (1993) PhD, Indiana University, 1981. Teacher Education and Instructional Design.

Hardy, Garry R. (1970) EdD, University of Houston, 1977. Science Education.

- Jacobs, James S. (1976) EdD, University of Georgia, 1978. Children's Literature.
- Moore, Blaine H. (1969) EdD, University of Northern Colorado, 1969. Reading and Linguistics.
- Nelson, Marvin N. (1959) PhD, University of Utah, 1975. Mathematics Education.
- Tunnell, Michael O. (1992) EdD, Brigham Young University, 1986. Children's Literature and Language Arts.

Assistant Professors

- Birrell, James R. (1993) EdD, University of Nevada, Las Vegas, 1993. Teacher Education and Reading.
- Fawson, Parker C. (1993) EdD, Brigham Young University, 1989. Reading and Language Arts.

Graduate Degrees and Programs

- MA, MEd Teaching and Learning
EdD Reading

Area of Specialization

PhD: Literacy Education. Interested students should consult the Instructional Science Department.

Degree and Program Requirements

MA, MEd Teaching and Learning

The MA and MEd programs in teaching and learning provide two options for completing graduation requirements. The student may elect the summer residency program or the full-time, on-campus program. The summer residency option consists of a minimum of three full-time summers on the campus, with intervening supervised field experiences during the fall and winter semesters. The on-campus program is for those who attend the university as full-time students. Both programs, MA and MEd, are designed for fall, winter, and summer entrance.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—May 15 (U.S.)
Winter	—June 30 (international)
	—September 15 (U.S.)
Summer	—December 31 (international)
	—April 15 (U.S.)
 - B. Entrance examination: GRE General Test. Scores (not to be more than five years old) must be submitted to Department of Elementary Education when applying.
 - C. GPA: Minimum of 3.25 for last 60 hours.
 - D. Teaching record: One year of successful teaching experience.

Requirements for Degree

- I. Credit hours (36): Minimum 36 course work hours.
- II. Required courses: Determined in consultation with advisory committee. A maximum of 10 semester hours of approved graduate transfer credit is allowed.
- III. Faculty recommendation upon completion of ELED 672R.

IV. Residency:

- A. Full-time, on-campus program: Two consecutive full-time semesters.
- B. Summer residency: Minimum three consecutive full-time summer terms with supervised course work during fall and winter semesters for two years.
- V. Thesis (MA: 6 hours, ELED 699R) or professional improvement project (MEd: 3 hours, ELED 693R, 695R, 696R).

VI. Examinations:

- A. Comprehensive written or oral examination.
- B. Oral defense of thesis or project.

EdD Reading

Admission and Entry

- I. Admission application evaluated by department graduate faculty. Admission considered according to resources available.
- II. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—May 15 (U.S.)
Winter	—June 30 (international)
	—September 15 (U.S.)
Summer	—December 31 (international)
	—April 15 (U.S.)
 - B. Entrance examination: GRE General Test. Scores (not to be more than five years old) must be submitted to Department of Elementary Education when applying.
 - C. GPA: Minimum 3.25 for last 60 hours.
 - D. Successful completion of three years of acceptable professional teaching experience in education or equivalent experience.

Requirements for Degree

- I. Credit hours (95): Minimum 95 hours, including 12 dissertation hours (ELED 799R). Up to 36 hours from an approved master's degree may apply.
- II. Skill requirements (included in 95 required hours). Courses required:
 - ELED 517: Professional and Scholarly Writing in Education
 - IS 651: Quantitative Reasoning
 - IS 653: Measurement Theory
 - IS 672: Empirical Inquiry in Education or ELED 672R: Introduction to Research Design
- III. Required courses:
 - A. 36 hours required in reading, including 12 hours of dissertation. A minimum of 12 hours must be taken outside the College of Education or concentrated within another department of the college.
 - B. Remaining hours to be determined in consultation with advisory committee.
- IV. Residency: Two consecutive full-time semester registrations (9 hours each).
- V. Dissertation.

- VI. Examinations:
A. Written and oral comprehensive examinations taken upon completion of course requirements.
B. Oral defense of dissertation.
- VII. Time limit: Graduate within eight years following admission.

Elementary Education Graduate Courses

Note: ELED 514R and 515R are for certification purposes only and are listed in the BYU Undergraduate Catalog.

530. Principles of Learning. (3) Su

Improving classroom learning through understanding underlying psychological principles and theories.

533. Written Expression in the Elementary Schools. (2) On dem.

Foundation, objectives, and strategies for teaching the writing process to elementary students, including spelling, handwriting, and integration with listening and speaking skills.

620. Organization and Administration of Reading Programs. (2) On dem.

Examining ways to organize and administer school and classroom reading programs. Examining issues relating to program types, reading assessment, grouping, grade level articulation, and supervision.

632. Science in Elementary Education. (2) W, Su

Teaching elementary science; current developments and trends. Planning instructional materials and procedures for a science curriculum.

633. Trends and Issues in Literacy Education. (3) On dem.

Research, literature, and trends in listening, speaking, and writing, with their implications for instruction.

635. Mathematics in Elementary Education. (2) W, Su

Issues, research, and innovations in teaching elementary school mathematics.

636. Social Studies in Elementary Education. (2) Su

Domains, methods, and theories of social studies, including innovative content, e.g., law-related education, consumer education, etc.

640. Literature for Young People. (3) W, Su

Overview of (primarily) American literature of elementary school pupils; contemporary authors, trends, and classroom applications.

641. Trends and Issues in Reading. (3) F, Su

Developmental, functional, and recreational reading, with focus on research, literature, and trends in reading instruction.

642. Emergent Literacy. (2) F, Su alt. yr.

Needs of young readers and approaches to teaching them to read.

645. Classroom Reading Diagnosis. (3) Su

Formal and informal diagnostic procedures for classroom teachers to use in assessing and correcting reading deficiencies.

647. Comprehending Expository and Narrative Text.

(2) W, Su alt. yr.

Comprehending and retaining text materials in different subject areas, including study and writing strategies for learning from school texts.

648R. Practicum in Reading. (1–4) F, W, Su

Prerequisite: ELED 645.

Diagnosing reading difficulties, designing effective teaching strategies, and evaluating effectiveness of instruction.

650. Technology in Reading and Evaluation of Reading Materials. (1–3) On dem.

Using available software and technology for reading instruction in elementary schools and a critical analysis of print and nonprint materials.

660. Historical Foundations in Reading. (2) W

In-depth study of the history of reading education, books, and reading instruction with implications for present-day reading practices.

672R. Introduction to Research Design. (1–3) F, Su

Introduction to designing, conducting, analyzing, reporting, and evaluating research studies in education.

676. Research in Reading. (2) Su

Prerequisite: ELED 641.

Research literature in reading, both classical and current, emphasizing application of findings to educational practice.

680R. Professional Internship. (1–6) F, W, Sp, Su

Professional work experience in area of specialization under direction of a faculty member.

690. Master's Colloquium. (1) On dem.

Current research and educational studies by faculty and students for collegial critique and analysis.

693R. Directed Individual Study. (1–4) F, W, Sp, Su

695R. Independent Research. (1–6) F, W, Sp, Su

Conceptualizing, designing, implementing, and evaluating a student-initiated project in a school classroom for curriculum improvement.

696R. Professional Education Project. (1–6) F, W, Sp, Su

Developing, observing, gathering, interpreting, and reporting data derived from a project in relation to the student's professional assignment.

699R. Master's Thesis. (1–6) F, W, Sp, Su

Formal report and defense of substantive research, evaluation, or curriculum project designed to make an original contribution to knowledge in the field.

734. Literacy Seminar. (2) On dem.

Significant research and publications in language arts and their implications for classroom practice.

740. Theoretical Models of Reading. (2) Su alt. yr.

In-depth study of the theoretical models of the reading process. Statistical, psychological, literary, linguistic, and motivational models analyzed and critiqued.

741. Psychology and Physiology of Reading. (2) Su alt. yr.

Physiology of the eye, ear, and brain as these relate to the reading act and potential reading disabilities; psycho-physical measurement methods.

742. Teaching Reading Vocabulary and Comprehension. (2) On dem.

Theories and research studies of vocabulary acquisition and reading comprehension as they relate to effective teaching.

743. Oral Language Acquisition: Parallels in Reading and Writing Development. (2) On dem.

Developmental reading stage theories, writing development theories, and invented spelling research; how these relate to oral language acquisition.

780R. Professional Internship. (1-8) F, W, Sp, Su

Professional work experience in area of specialization under direction of a faculty member.

790R. Advanced Seminar. (1-3) On dem.

Significant research and publications and their implications to reading instruction.

793R. Directed Individual Study. (1-4) F, W, Sp, Su**795R. Independent Research.** (1-6) F, W, Sp, Su

Conceptualizing, designing, implementing, and evaluating student-initiated research.

799R. Dissertation. (1-12) F, W, Sp, Su

Formal report and defense of substantive research, evaluation, or curriculum project designed to make an original contribution to knowledge in the field.

Engineering Management and Technology Management

Program Director: Ronald E. Terry, 270 CB, 378-4326

Graduate Degrees and Programs

MEM Master of Engineering Management

MTM Master of Technology Management

Areas of Specialization

MEM: Chemical Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, Manufacturing Engineering, Mechanical Engineering
MTM: Electronics Engineering Technology, Manufacturing Engineering Technology

The Master of Engineering Management (MEM) Program and the Master of Technology Management (MTM) Program are designed to assist graduates from the engineering and technology departments to obtain an education that will enhance their ability to move into technical management. The programs include a significant commitment to advanced engineering or technology training and management skills that will be useful in entry-level technical management.

Minimum requirements include a BS degree in engineering or technology or enrollment in an integrated master's program (with the expectation of completing a BS degree by December of the year of entry and the ability to include required management courses taught during

the term or semester of entry). Entrance is competitive, and the program is limited to fifty students. Scholarship funds are available from the Jerry Christiansen Scholarship funds.

MEM/MTM programs have two tracks available for students. These two tracks are the standard track and the international track. The two tracks are described below in terms of the admission procedures and requirements for the degrees.

Degree and Program Requirements

MEM Engineering Management

MTM Technology Management

Admission and Entry**I. Application requirements:**

A. Semesters of entry and application deadlines:

Fall —February 28 (international)

—May 15 (U.S.)

Winter —June 30 (international)

—September 15 (U.S.)

Spring —October 31 (international)

—February 15

Summer —October 31 (international)

—February 15

Fall semester entrance is strongly recommended. Entry winter semester and spring and summer terms is available but will extend the length of the program.

B. Entrance examination: GRE General Test for applicants from non-ABET (Accreditation Board for Engineering and Technology, Inc.) accredited institutions.

C. Indicate in writing a desire to be considered for program.

D. Submit application to Graduate Admissions, B-356 ASB. When application is complete it will be sent to the MEM/MTM program director, 270 CB.

II. Prerequisite: Baccalaureate degree in engineering or technology.

III. In addition to items I and II listed above, students wishing to be considered for entry into the international track will need to have completed the requirements for the university's General Education foreign language option or demonstrate the equivalent competency.

Requirements for Degree (Standard Track)

I. Credit hours (40): Minimum 40 course work credit hours.

II. Basic curriculum requirements:

A. Fall semester: Mgt 501 (3), 561 (3), EngT 500 (1), technical electives (6)

B. Winter semester: Mgt 511 (3), 541 (3), 562 (3), EngT 501 (1), technical elective (3)

C. Spring term: Mgt 551 (3), technical elective (3)

D. Summer term: Mgt 580 (3), 565 (2), technical elective (3)

III. Residence: See Residence Requirements on page 38.

Requirements for Degree (International Track)

- I. Credit hours (42): Minimum 40 course work credit hours.
- II. Basic curriculum requirements:
 - A. Fall semester: Mgt 501 (3), 561 (3), Bus 430 (3), EngT 500 (1), technical electives (6)
 - B. Winter semester: Mgt 511 (3), 541 (3), 562 (3), MBA 637 (3), EngT 501 (1), technical elective (3)
 - C. Spring term: technical elective (3)
 - D. Summer term: Mgt 580 (3), 565 (2)
 - E. International internship (2)
- III. International internship: Students are required to reside in a foreign country for a minimum of one semester or term and participate in an approved technical work experience. The college will assist students in securing an acceptable foreign opportunity. During this time, students are also expected to engage in independent study to improve their technical foreign language vocabulary. At the completion of the foreign work experience, the students will need to submit a report on their internship as well as documentation of their independent study of the technical language. If an international internship cannot be found, a student may substitute an approved domestic internship.
- IV. Residence: See Residence Requirements on page 38.

Courses for Master of Engineering Management and Master of Technology Management

EngT 500. Technical Management Seminar. (1)

Opportunities and challenges in technical management. Interaction with engineering managers in dealing with technically trained employees.

EngT 501. Management Simulation. (1)

Use of Aerospace Environment Business Simulator (computer program) to provide time-compressed experiences in managing a company involved in research, development, and manufacturing.

Mgt 501. Managerial Accounting. (3)

Nature, objectives, and procedures of cost accounting. Topics include job costing, joint product costing, cost behavior analysis, standard costs; problems of cost allocation, and uses of cost data in decision making.

Mgt 511. Managerial Finance. (3)

Financing problems facing a business: managing working capital and long-term assets; financing capital requirements in the short and long term; techniques of financial analysis and planning; identifying and valuating cash flows; cost of capital; capital budgeting, structure, and markets; raising corporate capital.

Mgt 541. Marketing Management. (3)

Development of analytical marketing tools and techniques and their utilization in case analysis and decision making in marketing management.

Mgt 551. Organizational Behavior. (3)

Analysis of individual, group, and organizational variables that inhibit or facilitate effective organizational functioning. Topics include motivation, rewards, leadership, conflict, decision making, structure evaluation, change, and organizational functioning, design, and control.

Mgt 561. Operations Management. (3)

Examination of analytical methods for the management of business operations; techniques for design; operation and control of operating systems.

Mgt 562. Project Management. (3)

Continuation of Mgt 561, with particular emphasis on project planning and control.

Mgt 565. Written and Oral Communication. (2)

Organization of the writing process necessary for letters, memos, resumés, and reports, emphasizing current business practices. Oral practice includes using videotape to enhance interviewing and presentation skills: standing, sitting, and prepared and impromptu communication.

Mgt 580. Business Policy. (3)

Principles and concepts presented in finance, marketing, operations, and organizational behavior; a top management approach to the problems of determining corporate strategy.

English

Chair: Neal E. Lambert, 3146 JKHB, 378-3053

Graduate Coordinator: Jay Fox, 3142 JKHB, 378-4939

Faculty/Specialties

Professors

Beecher, Maureen Ursenbach (1980) PhD, University of Utah, 1973. Women's History, Mormon Literature.

Bell, Louise M. (1963) MA, Brigham Young University, 1959. Creative Writing.

Blanch, Mae (1959) PhD, University of Colorado, 1966. British, American, and European Novel.

Cracraft, Richard H. (1963) PhD, University of Wisconsin, Madison, 1969. Nineteenth-Century American Literature, Literature of the American West, Mormon Literature.

Crisler, Jesse S. (1993) PhD, University of South Carolina, 1973. American Literature.

Cronin, Gloria L. (1984) PhD, Brigham Young University, 1980. Twentieth-Century American Literature, Jewish American Literature, African-American Literature, Nineteenth- and Twentieth-Century American Women's Literature.

England, Eugene (1977) PhD, Stanford University, 1973. Nineteenth-Century American Literature, Mormon Literature, Creative Writing, Shakespeare.

Fox, Jay (1980) PhD, Purdue University, 1971. Late Nineteenth- and Early Twentieth-Century British Literature, Literature and Film.

Gassman, Byron W. (1960) PhD, University of Chicago, 1960. Restoration and Eighteenth-Century English Literature, English Novel.

- Geary, Edward A. (1968) PhD, Stanford University, 1971. Late Nineteenth- and Early Twentieth-Century British and American Literature, English Novel.
- Lambert, Neal E. (1966) PhD, University of Utah, 1966. American Literature 1620–1860.
- Murphy, John J. (1984) MA, St. John's University, 1961. Nineteenth- and Early Twentieth-Century American Literature.
- Norris, G. Leslie (1983) MPhil, Southampton University, England, 1958. Creative Writing, English Romantic Literature, Contemporary Poetry, Twentieth-Century English Poetry and Prose.
- Skousen, Royal (1979) PhD, University of Illinois, 1972. Linguistics (Phonology, Morphology, Analogical Modeling, Mathematical Linguistics, Historical Linguistics), English Linguistics (Structure of English, English Spelling), Textual Criticism.
- Tanner, John S. (1982) PhD, University of California, Berkeley, 1980. Sixteenth- and Seventeenth-Century English Literature, Religious Approaches to Literature.
- Tanner, Stephen L. (1978) PhD, University of Wisconsin, Madison, 1969. American Literature, Literary Criticism.
- Tate, Charles D. (1960) PhD, University of Colorado, 1966. Seventeenth-Century British Literature, Editing.
- Taylor, Sally T. (1978) PhD, University of Utah, 1975. Technical Writing, Creative Writing, Drama.
- Thayer, Douglas H. (1957) MFA, University of Iowa, 1962. Creative Writing.
- Walker, Steven C. (1966) PhD, Harvard University, 1973. Victorian Literature, Bible as Literature.
- Wilson, William A. (1984) PhD, Indiana University, 1974. Folklore and Mythology, American Studies.
- Associate Professors**
- Ballantyne, VerDon W. (1963) MA, Brigham Young University, 1964. American Literature, Technical Writing.
- Best, Brian S. (1960) PhD, University of Wisconsin, Madison, 1971. Later British Literature, Shaw.
- Best, Lorna N. (1958) MA, Brigham Young University, 1962. British Literature and Shakespeare.
- Boswell, Grant M. (1984) PhD, University of Southern California, 1985. Rhetorical Theory, Composition Theory and Pedagogy.
- Clark, Gregory (1985) PhD, Rensselaer Polytechnic Institute, 1985. Rhetorical Theory and Criticism, Early American Literature, Composition Theory and Pedagogy.
- Cowles, David L. (1985) PhD, University of Chicago, 1985. Victorian Literature, English Novel, Poststructuralist Theory.
- Crowe, Christopher E. (1993) EdD, Arizona State University, 1986. English Education, Adolescent Literature, Teaching of Writing.
- Egginton, William G. (1989) PhD, University of Southern California, 1984. Varieties of English, Contrastive Rhetoric, Language Planning and Policy, Literacy, Cross-cultural Communication.
- Hansen, Kristine (1987) PhD, University of Texas, Austin, 1987. Rhetoric, Composition Theory, Composition Pedagogy, Composition Research.
- Hayes, Darwin L. (1961) MA, Brigham Young University, 1963. English Language.
- Hunsaker, O. Glade (1964) PhD, University of Illinois, 1970. Seventeenth-Century British Literature, Milton.
- Johnstoneaux, Raphael (1986) PhD, George Peabody College for Teachers of Vanderbilt University, 1980. Modern American Literature, English Education, Composition Theory and Pedagogy.
- Jorgensen, B. W. (1975) PhD, Cornell University, 1978. Creative Writing (especially fiction), Nineteenth-Century American Literature (especially the "American Renaissance"), Contemporary American Fiction.
- Lundquist, Suzanne E. (1984) DA, University of Michigan, 1985. Native American Sacred Texts and Modern Novels, Third World Literature, Development of Literacy.
- Nelson, Joyce (1990) MS, Florida State University, 1971. English Education, Critical Reading.
- Perry, Catherine Corman (1985) PhD, University of California, Los Angeles, 1985. Chaucer, Medieval English Literature, Old English, Middle English.
- Paxman, David B. (1988) PhD, University of Chicago, 1982. Eighteenth-Century English Literature, Intellectual History, Prose Fiction.
- Pedersen, Elray L. (1983) PhD, University of Minnesota, 1977. English Education, Teaching of Writing, Linguistics.
- Smith, Marion K. (1964) PhD, University of Texas, 1986. Technical Writing.
- Spencer, Darrell K. (1985) PhD, University of Utah, 1986. Creative Writing, American Novel, Contemporary Fiction.
- Wahlquist, Elizabeth (1962) MA, M. Litt., Middlebury College, 1962, 1971. Modern American Literature, Robert Frost, Canadian Literature, Adolescent Literature.
- Williams, Ray S. (1966) PhD, Florida State University, 1965. Colonial and Nineteenth-Century American Literature.
- Young, Bruce W. (1983) PhD, Harvard University, 1983. English Renaissance Literature, Shakespeare, Literary Theory and Criticism.
- Assistant Professors**
- Bennion, John S. (1989) PhD, University of Houston, 1989. Creative Writing, Victorian Literature, English Novel.
- Duerden, Richard Y. (1989) PhD, University of Chicago (1989). Sixteenth- and Seventeenth-Century English Literature, Literary Theory and Criticism.
- Farr, Cecilia Konchar (1990) PhD, Michigan State University, 1990. Modern American and British Literature, Literary Theory and Criticism, Nineteenth-Century American Literature.
- Hallen, Cynthia L. (1991) PhD, University of Arizona, 1991. Philology, Lexicography, Rhetoric, Composition, Nineteenth-Century American Literature, Dickinson.
- Harris, Claudia W. (1990) PhD, Emory University, 1990. Modern and Contemporary Drama, Contemporary British Literature, Irish Studies.
- Hatch, Gary L. (1992) PhD, Arizona State University, 1992. History and Theory of Rhetoric, Composition Theory and Pedagogy, Argumentation, Eighteenth-Century British Literature.

- Houston, Gail T. (1990) PhD, University of California, Los Angeles, 1990. Victorian Literature, English Novel, Women's Studies.
- Howe, Susan (1989) PhD, University of Denver, 1989. Creative Writing, Modern and Contemporary Drama, Contemporary American Poetry.
- Larsen, Lance E. (1993) PhD, University of Houston, 1993. Creative Writing, American Literature, British Romantic Literature, Contemporary Poetry.
- Lawrence, A. Keith (1992) PhD, University of Southern California, 1987. Early American Literature, Asian-American Literature.
- Lofgren, Charlotte D. (1970) MA, Brigham Young University, 1973. Composition.
- Muhlestein, Daniel J. K. (1993) PhD, Rice University, 1992. Literary Theory, English Romantic Literature.
- Norton, Don E. (1967) MA, Brigham Young University, 1961. English Language, Usage.
- Oaks, Dallin D. (1990) PhD, Purdue University, 1990. English Linguistics, Old English Language and Literature.
- Plummer, Louise R. (1993) MA, University of Minnesota, 1984. Creative Writing.
- Ream, Susan E. (1961) MA, Columbia University, 1958. English Language, Usage.
- Rigby, W. Dean (1966) MA, Brigham Young University, 1970. Composition.
- Snyder, Phillip A. (1988) PhD, University of North Carolina at Chapel Hill, 1988. Twentieth-Century British and American Literature, Autobiography.
- Sorensen, Peter J. (1990) PhD, Washington State University, 1988. English Romantic Literature.
- Thomas, Paul R. (1980) DPhil, University of York, England, 1982. Chaucer, Middle English Language and Literature, English Renaissance Literature.
- Graduate Degree and Program**
MA English

Degree and Program Requirements

MA English

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
 - B. Entrance examination: GRE advanced literature subject test is optional.
 - C. Application, including writing sample (5–10 double-spaced pages, printed back to back).
- II. Prerequisite:
 - A. Undergraduate major or its equivalent.
 - B. One course in literary criticism (Engl 351 or 352 or equivalent) and one course in the history of the English language (Engl 324 or equivalent).
 - C. Reading knowledge of one foreign language.

Requirements for Degree

- I. Credit hours (31): Minimum 25 course work hours plus 6 thesis hours (Engl 699R).
- II. Core requirement (10 hours):
 - A. Engl 600 (Introduction to Graduate Studies, 1)

- B. Engl 610, or a rhetoric section of Engl 521R with approval (3)
- C. Engl 620 or, with approval, Engl 527, 528, 529, 624, or 626 (3)
- D. Engl 630 or, with approval, Engl 650R (3).

- III. Emphasis: 9 hours of course work in an approved area of emphasis beyond the core that will support 6 hours' work on thesis. The emphasis must constitute a coherent body of study in an area the faculty can support. Areas of emphasis are American literature, creative writing, English literature (beginning to 1800), English literature (1800 to present), folklore and ethnic literature, language, rhetoric. Courses within an emphasis are proposed by the student and approved through appropriate departmental process.
- IV. Electives: 6 hours of approved study outside the core and area of emphasis.
- V. Limitation on individual readings courses: No more than 3 hours of individual readings (Engl 590R) may be applied to the minimum 25 hours of course work.
- VI. Thesis: (6 hours of 699R). Thesis on a topic demanding research and analysis; or, for those with creative writing as their approved emphasis, a substantial creative work.
- VII. Examination: Examination on thesis, related course work in emphasis, and an approved reading list related to emphasis.

English Graduate Courses

500R. Eminent American Writers. (1-3)
Different writers each semester.

510R. Eminent English Writers. (1-3)
Different writers each semester.

515R. Advanced Scholarly Writing. (3)
Workshop for potential graduate students, graduate students, and professionals in all disciplines in preparing the thesis, dissertation, book chapter, and article.

516. Advanced Technical Writing. (3)
Prerequisite: Engl 316 or instructor's consent.
Advanced concepts, including literature of technical writing, liaison with technical staff, communication networks, rhetoric of graphics, and teaching and freelancing technical writing.

518R. Advanced Creative Writing. (3)
Prerequisite: Engl 318R, 319R, or instructor's consent.
Writing fiction, poetry, drama, and the essay; individual consideration of manuscripts; professional orientation. May be repeated for credit with departmental approval.

520R. Studies in Theme and Form. (1-3)
Topics vary: literature and film, myth and archetype, science fiction, etc.

521R. Studies in Language and Rhetoric. (1-3)
Prerequisite: Engl 324.
Topics vary with instructor.

527. Early Modern English. (3)

Prerequisite: Engl 223, 324.

English language from about 1500 to 1800, with special emphasis on the language of Shakespeare and the King James Bible.

528. Varieties of English. (3)

Prerequisite: Engl 223, 324.

Regional and social variation in English, especially standard and nonstandard national and world Englishes, including English-based pidgins and creoles.

529. Structure of Modern English. (3)

Prerequisite: Engl 328, Ling 325, or instructor's consent.

English syntax through modern grammars; theories underlying those grammars.

590R. Individual Readings in English. (1-3)

Prerequisite: graduate coordinator's consent.

Language and/or literature beyond what is offered in the curriculum. May not be substituted for another catalog course.

599R. Cooperative Education. (1-9)

Prerequisite: department chair's consent.

On-the-job training.

600. Introduction to Graduate Studies. (1)

Trends in postgraduate curricula, ideology, pedagogy, and professional publication in language and literature.

610. Rhetoric and Composition. (3)

Theory and methods of teaching rhetoric and composition; emphasis on rhetoric's relationship to the study of literature and language. (Required of all graduate student instructors.)

612. History of Rhetoric. (3)

Major texts, thinkers, and movements of the Western rhetorical tradition from classical antiquity to the present.

614. Theory of Rhetoric and Composition. (3)

Prerequisite: Engl 610.

Rhetorical theory and its relationship to current issues in rhetoric and composition.

616. Research in Rhetoric and Composition. (3)

Prerequisite: Engl 610.

Research methods in rhetoric and composition; evaluation of assumptions, strengths, and limitations of each method; identification of student research topics.

620. Language and Literature. (3)

Literature from a language perspective; applying linguistic constructs to literary language; examining literary style; linguistic analysis of unfamiliar texts.

624. Old English. (3)

Old English grammar and vocabulary; traditional syntactical patterns in various types of Old English prose and poetry.

625. Beowulf. (3)

Prerequisite: Engl 624.

Close reading of the poem in the original, emphasizing literary and cultural values.

626. Middle English. (3)

Detailed study of the principal dialects as illustrated in the literature of the period.

630. Theoretical Discourse. (3)

Modes of criticism: how to analyze assumptions, methods, and interpretations; how theory relates to practice; how to manage conflict among theories.

631. Studies in the English Novel. (3)

Analysis of literary values and techniques in selected novels.

635. Studies in the American Novel. (3)

Various approaches to the novel, emphasizing the formal.

641. Studies in Drama. (3)

Intensive study of drama.

650R. Studies in Literary Criticism. (3)

Modern critical theory and practice applied to specific literary works.

655. Women's Textual Studies. (3)

Ways feminist critical insights affect the study of language, literature, and culture.

658R. Ethnic, Regional, and Other Literatures in English. (3)

Emphasis varies with instructor.

661. Studies in Early American Literature. (3)

Texts from times of the English settlement through the early 1800s.

662. Studies in Early Nineteenth-Century American Literature. (3)

Texts from the early 1800s through midcentury, with special attention to romanticism in America.

664. Studies in Late Nineteenth-Century American Literature. (3)

Texts from the middle through the end of the nineteenth century, with special attention to realism in America.

665. Studies in Early Twentieth-Century American Literature. (3)

Texts, trends, and writers from 1900 to midcentury.

666. Studies in Late Twentieth-Century American Literature. (3)

Texts, trends, and writers from the end of World War II to the present.

667. Studies in Folklore. (3)

Prerequisite: Engl 391 or instructor's consent.

Directed study in folklore and folkways, including Mormon heritage and tradition. Collecting, analyzing, and editing.

669R. Teaching English in the Secondary Schools. (2)

Prerequisite: Engl 377 or instructor's consent.

Literature, writing, language, and reading materials appropriate to English courses; effective use of these materials.

671. Studies in English Medieval Literature. (3)

Close reading in the original of a principal work, such as *Trilibus et Cryseyde*, *Piers Plowman*, or *Sir Gawain and the Green Knight*, emphasizing its relation to other literature, culture, and history of the period.

672. Studies in English Renaissance Literature. (3)
Individual authors, styles, influences, and trends in sixteenth- and seventeenth-century English literature.
673. Studies in English Classicism. (3)
Selected writers from 1660 to 1780.
674. Studies in English Romanticism. (3)
Selected writers and trends from 1780 to 1832.
675. Studies in Victorian Literature. (3)
Literary genres, values, and techniques in representative works from 1832 to 1890.
676. Studies in Modern British Literature. (3)
Selected authors and works from 1890 to 1950.
680. Studies in Contemporary Literature. (3)
Specific trends in literature and criticism since mid-century.
682. Studies in Shakespearean Scholarship and Criticism. (3)
- 699R. Master's Thesis. (Arr.)
See options described under master's program in English.

Family Sciences

Chair: Terrance D. Olson, 1000 SWKT, 378-2060
Graduate Coordinator: Robert F. Stahmann, 240 TLRB,
378-6508

Faculty/Specialties

Professors

- Allred, G. Hugh (1966) EdD, University of Oregon, 1966.
Adult Survivors of Childhood Abuse and Their Families.
- Brasher, Ruth E. (1969) PhD, Utah State University, 1969.
Family and Social Systems, Theoretical Foundations of Home Economics, Adult Education.
- Burr, Wesley R. (1969) PhD, University of Minnesota,
Minneapolis, 1967. Developing and Applying Theories in Family Sciences.
- Crane, D. Russell (1983) PhD, Brigham Young University, 1979. Marital Therapy and Divorce.
- Feinauer, Leslie L. (1984) PhD, Brigham Young University, 1981. Family Violence, Aging Families.
- Galbraith, Richard C. (1975) PhD, Northwestern University, 1975. Children's Intelligence and Memory.
- Harper, James M. (1979) PhD, University of Minnesota, Minneapolis, 1979. Marital and Family Therapy, Family Relationships.
- Larsen, Jean M. (1963) PhD, University of Utah, 1972.
Effects of Preschool, Teacher Training, Care and Education of Young Children, Parent/Provider Training.
- Mead, D. Eugene (1967) EdD, University of Oregon, 1967. Marriage and Family Therapy.
- Olson, Terrance D. (1974) PhD, Florida State University, 1972. Philosophy of Family Science, Family Life Education.
- Peery, J. Craig (1980) PhD, Columbia University, 1973.
Human Development, Personality and Social Development.

- Price, Alvin H. (1966) PhD, University of Minnesota, 1963. Child Psychology.
- Stahmann, Robert F. (1975) PhD, University of Utah, 1967. Premarital Counseling; Marital, Sexual, and Family Therapy.

Associate Professors

- Beutler, Ivan F. (1981) PhD, Purdue University, 1974.
Family Resource Management.
- Draper, Thomas W. (1982) PhD, Emory University, 1976.
Children and Technology, Men, Children.
- Hart, Craig H. (1992) PhD, Purdue University, 1987.
Child Development and Early Childhood Education.
- Holman, Thomas B. (1985) PhD, Brigham Young University, 1981. Courtship, Mate Selection, Marital Quality, Family Life Education.
- Larson, Jeffry H. (1992) PhD, Texas Tech University, 1980.
Family Science, Family Intervention, Therapy.
- Lind, Charlene (1964) PhD, University of Wisconsin, 1974. Social/Psychological Aspects of Clothing.
- McKee, Trevor R. (1974) PhD, Brigham Young University, 1973. Language Acquisition and Duolinguistic Parenting.
- Poduska, Bernard E. (1983) PhD, Brigham Young University, 1983. Family Resource Management, Family Interaction.
- Robinson, Clyde C. (1990) PhD, University of North Carolina at Greensboro, 1982. Child Development, Family Relations.
- Rowley, Maxine R. (1980) PhD, Brigham Young University, 1989. Education Administration in Higher Education.
- Watson, Wendy L. (1993) PhD, University of Calgary, 1984. Family Therapy, Gerontology.

Assistant Professors

- Bahr, Kathleen S. (1970) PhD, Michigan State University, 1982. Family Ecology, Home Management and Family Relationships.
- Dollahite, David C. (1993) PhD, University of Minnesota, 1988. Family Resource Management.
- Ellsworth, Carol (1969) EdD, Brigham Young University, 1980. Curriculum and Instruction.
- Garrison, Carolyn (1970) PhD, Purdue University, 1978. Household Equipment and Housing, Adult Education.
- Hawkins, Alan J. (1990) PhD, Pennsylvania State University, 1990. Human Development and Family Studies.
- Klein, Shirley R. (1986) PhD, University of Utah, 1990. Cultural Foundations of Education, Curriculum, Instruction, Home and Family Issues in Secondary Classrooms.
- Olsen, Susanne Frost (1993) PhD, University of Minnesota, 1988. Family Resource Management.

Graduate Degrees and Programs

- MS, PhD Family Sciences
PhD Family Studies
MS, PhD Marriage and Family Therapy

Degree and Program Requirements

MS Family Sciences

The MS degree in family sciences provides the student with a comprehensive, broad-based understanding in human development and/or family science. Four subject areas are available to the student according to his or her professional goals: family life education, family resource management, human development, and home economics education. The home economics education program accommodates part-time as well as full-time students.

Admission and Entry (same for all specialties)

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall —February 1 (U.S. and international)
 - B. At least three letters of recommendation are required, at least two from academic faculty or others qualified to assess academic qualifications.
 - C. GRE General Test.
- II. Prerequisite:
 - A. Family sciences: FamSc 310, 460, and other courses as required by graduate committee.
 - B. Home economics: Stat 552 or equivalent and other courses as required by graduate committee.
 - C. Human development: FamSc 310, 422; Psych 301, 302, 341.

Requirements for Degree

- I. Credit hours:
 - A. Family sciences: (36): Minimum 30 course work hours plus 6 thesis hours (FamSc 699R).
 - B. Home economics education: (30): Minimum 24 course work hours plus 6 thesis hours (FamSc 699R).
- II. Required courses:
 - A. Family life education: FamSc 514, 560, 565, 600, 699R (6 hours minimum).
 - B. Family resource management: FamSc 460, 540, 545, 560, 570, 600, 699R (6 hours minimum); Stat 554.
 - C. Home economics education:
 1. For instructional or curricular emphasis: FamSc 565, 600, 676, 689, Stat 554, FamSc 699R.
 2. For international emphasis: FamSc 565, 600, 662, 678, 689, Stat 554, FamSc 699R.
 - D. Human development: FamSc 510, 511, 512, 513, 514, 600, 602, 660, 699R (6 hours minimum); Stat 501; PE 550.
- III. Electives:
 - A. Family life education: 15–20 hours determined in consultation with advisory committee.
 - B. Family resource management: 6–9 hours from FamSc 501R, 595R, 601, 675, 689; or courses approved by advisory committee.
 - C. Home economics education: As determined in consultation with advisory committee. FamSc 530 recommended.

D. Human development: As determined in consultation with advisory committee.

- IV. Minor: Any minor approved by advisory committee, but none is required.
- V. Thesis.
- VI. Examination: Oral defense of thesis.

MS Marriage and Family Therapy

The department offers the master of science (MS) degree as a two-year program. The objective of this degree is to train persons who will be outstanding clinicians, prepared to function in a wide variety of marriage and family therapy settings. The curriculum is based on state licensure/certification requirements and is accredited by the Commission on Accreditation of the American Association for Marriage and Family Therapy. The master's degree is the basic credential for independent practice in marriage and family therapy.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall —February 1 (U.S. and international)
 - B. Entrance examination: GRE General Test.
- II. Prerequisite: Background in research, e.g., research methodology and statistics (5 hours); behavioral sciences, e.g., personality, child development, abnormal psychology, learning theory (9 hours); social sciences, e.g., family living, social psychology, sociology (6 hours).

Requirements for Degree

- I. Credit hours (62): Minimum 56 course work hours plus 6 thesis hours (699R).
- II. Required courses: FamSc 555R (6 hours), 563, 564, 600, 640, 645, 650, 651, 652, 653, 654, 655R (10 hours), 656, 699R (6 hours); Stat 501 or Psych 501; electives (3 hours).
- III. Clinical requirement: 500 hours of direct client experience.
- IV. Thesis.
- V. Examination: Oral defense of thesis.

PhD Family Sciences

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall —February 1 (U.S. and international)
 - B. Entrance examination: GRE General Test.
- II. Prerequisite:
 - A. Master's degree in family sciences or equivalent.
 - B. Human development specialty candidates: Master's degree in human development or equivalent; direct admission with a BS or BA degree is possible, but outlined course work would be integrated into doctoral program.

Requirements for Degree

- I. Credit hours (72 plus skill): Minimum 54 course work hours plus 18 dissertation hours, plus skill requirement.

- II. Required courses: Determined in consultation with advisory committee.
- III. Minor: Any minor approved by advisory committee, but none is required.
- IV. Skill requirement: Consult department for details.
- V. Dissertation (18 hours minimum).
- VI. Examinations:
 - A. Written comprehensive examination.
 - B. Oral defense of dissertation.

For detailed information consult the department's Human Development Area coordinator.

PhD Family Studies

Details for this program are specified under the heading Family Studies, which follows this section. The Family Studies Program operates as an interdepartmental program involving the Departments of Family Sciences and Sociology.

PhD Marriage and Family Therapy

The program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education of the American Association for Marriage and Family Therapy and has three interrelated emphases—clinical practice, teaching/supervision, and research.

There are two options for the PhD degree in marriage and family therapy. The first is for students who already have a master's degree and should take approximately three years to complete. The second is for the post-baccalaureate student and should take approximately four years to complete. The master's curriculum is followed during the first two years, with the MS degree awarded at the completion of those requirements.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 1 (U.S. and international)
 - B. Entrance examination: GRE General Test.
- II. Prerequisite:
 - A. Post-master's option: Master's degree from a regionally accredited college or university. Applicants without a marriage and family therapy master's degree may need to complete prerequisite course work.
 - B. Post-baccalaureate option: Baccalaureate degree from a regionally accredited college or university; background in research, e.g., research methodology and statistics (5 hours); behavioral sciences, e.g., child development, abnormal psychology, learning theory (9 hours); social sciences, e.g., family sciences, psychology, social psychology, sociology (6 hours).

Requirements for Degree

- I. Credit hours (80 plus skill beyond baccalaureate; 48 plus skill beyond master's): Minimum 62 course work hours beyond the baccalaureate or 30 course work hours beyond the master's, plus 18 dissertation hours (FamSc 799R), plus skill hours.
- II. Required courses: Determined in consultation with advisory committee.

- III. Minor: Any minor approved by advisory committee, but none is required.
- IV. Skill requirement: Consult department.
- V. Clinical requirement: 500 hours of direct client experience.
- VI. Dissertation.
- VII. Examinations:
 - A. Written and oral comprehensive examinations in clinical practice, teaching/supervision, and research.
 - B. Oral defense of dissertation.

Program and Degree Resources

Camilla Eyring Kimball Chair of Home and Family Life
Center for Studies of the Family
Comprehensive Clinic
Early Childhood Education Lab
Women's Research Institute

Family Sciences Graduate Courses

501R. Workshop in Family Sciences. (1-2)

Prerequisite: 8 hours in family sciences, or department chair's consent.

Intensive study in applying principles of specified family sciences, subject matter in early childhood education, child development, family relationships, family resource management, or marriage/family therapy.

510. Seminar in Intellectual Development. (3)

Prerequisite: FamSc 514.

Current theories and research on intellectual development.

511. Seminar in Social Development. (3)

Prerequisite: FamSc 514.

Current theories and research on social development, emphasizing positive social development. Play, music, creativity, and friendship.

512. Seminar in Emotional Development. (3)

Current theories and research on emotional development.

513. Seminar in Moral Development. (3)

Current theories and research on moral development.

514. Seminar in Theories of Human Development. (3)

Prerequisite: FamSc 310.

Intensive investigation of theoretical frameworks, models, and concepts of dominant contemporary theories in child development.

520. Head Teachers Practicum in Preschool. (4)

Prerequisite: FamSc 422 or equivalent classroom experience with young children and instructor's consent.

Head teaching proficiencies: guiding teachers of young children, techniques for involving parents, evaluating student teachers, assessing child performance, review of child guidance, and curriculum development.

521R. Workshop in Home Economics Education. (1-2)

On demand.

Prerequisite: instructor's consent.

522R. Seminar in Early Childhood Education. (2)

Prerequisite: FamSc 422 and instructor's consent.

Teacher skills: developing, applying, measuring, and evaluating effective techniques. Curriculum: selecting, organizing, and creating curriculum materials for young children.

530. Home Economics Education for Adults. (2)

Prerequisite: home economics education background.

Principles, practices, programs, materials, and resources for teaching adults in the areas of home economics.

540. Family Economics. (3)

Economic functioning of household; role of income, employment, and household production as determinants of family living level.

545. Family Financial Resource Management. (3)

Prerequisite: FamSc 304 or equivalent.

Applying theories and principles in managing financial resources to meet needs of individuals and families.

550. History and Development of Theory about the Family. (3)

Prerequisite: FamSc 250, Soc 311, or equivalent.

Historical/intellectual roots of theorizing about families; paradigms and assumptions underlying theorizing; contemporary research and theory interface.

555R. Beginning Practicum in Marriage and Family Therapy. (2-3)

Prerequisite: FamSc 650 and instructor's consent.

Introduction to clinical methods and experience in counseling individuals, premarital and marital dyads, and families. For marriage and family therapy majors only.

560. (FamSc-Soc) Contemporary Theories about the Family. (3)

Contemporary theories and research about the family, emphasizing role exchange and systems theories.

561. Seminar in Family Law. (3)

Prerequisite: concurrent registration in FamSc 461.

Intensive investigation of issues and concepts influencing legal aspects of marriage and family life.

562. Seminar in Professional Responsibility. (3)

Ethical issues and legal responsibility in professional practice.

563. Theoretical Foundations of Family Systems. (3)

Systems theory and cybernetic approaches to family processes and epistemological issues.

564. Human and Family Development Over the Life Cycle. (3)

Interrelationships between individuals and family life cycle development, including modifying family processes and structure over time.

565. Instructional Processes in Family Sciences. (3)

Methods and curriculum of design, development, implementation, management, and evaluation related to family sciences and home economics curricula.

566R. Practicum in Family Life Education. (1-2)

Prerequisite: FamSc 565 or instructor's consent.

Supervised experience teaching family living courses in a university setting.

570. Paradigms in Family Process and Analysis. (3)

Prerequisite: FamSc 371 or equivalent.

Alternative perspectives on family management, governance, and participation, with emphasis on modernist/management vs. familial orientation affecting leadership, parenting, autonomy and choice, altruism, and individualism.

590R. Readings in Family Sciences. (1-2)

Prerequisite: FamSc 310 or 460; instructor's consent.

Discussions and reports of current readings.

595R. Special Topics in Family Sciences. (1-2)

Prerequisite: for family sciences major—FamSc 310 or 460; instructor's consent.

Individual study for qualified students.

600. (FamSc-Soc) Advanced Research Methods. (3) Alt. sem., Sp, Su

Prerequisite: Soc 300 or instructor's consent.

Training in survey, experimental, secondary analysis, content analysis, qualitative, evaluation, and environmental impact research techniques.

601. (FamSc-Soc) Seminar in Survey Research. (3)

Prerequisite: Soc 300 or equivalent.

Survey research techniques of the behavioral sciences, emphasizing research and sampling designs.

602. (FamSc-Soc) Experimental Design. (3)

Prerequisite: FamSc-Soc 600, Stat 501 or equivalent, or instructor's consent.

Research methods, logic, writing, and data analysis.

603R. (FamSc-Soc) Research Practicum. (3)

Prerequisite: instructor's consent.

Design, data collection, data analysis, and write-up.

604. (FamSc-Soc) Ethnographic Research Techniques. (3)

Prerequisite: FamSc-Soc 600 or equivalent.

Rationale, methods, and limitations of qualitative research; includes participant observation and hermeneutic skills.

622R. Advanced Seminar in Early Childhood Education. (2)

Prerequisite: FamSc 422, 522, or equivalent.

Supervision in ECE: practical experience in applying supervision principles. Administration of ECE: theories and issues applied to administrative processes and skills.

623. History, Theories, and Current Issues in Early Childhood Education. (3)

Prerequisite: instructor's consent.

History, background, philosophies, and models of preschool education. Examines current issues and innovations.

640. Clinical Specialization in Marriage and Family Therapy. (3)

Current research on family therapy-based treatment of specific clinical problems. For marriage and family therapy majors only.

645. Analysis and Treatment of Human Sexual Development. (3)
Prerequisite: FamSc 650.

Knowledge and skill required to analyze and treat questions related to human sexual development.

650. Theoretical Foundations of Marital and Family Therapy. (3)

Epistemological and theoretical issues in marital and family therapy, including normal family processes and personal and intergenerational family issues.

651. Psychopathology and Assessment in Marriage and Family Therapy. (3)

Interpreting and assessing mental disorders and dysfunctional relationships. Etiology and diagnosis of individual, marital, and family psychopathology.

652. Marital and Individual Psychotherapy. (3)

Assessment, intervention techniques, therapist's role, and principle processes in theories of systemic individual and marital psychotherapy. For marriage and family therapy majors only.

653. Family and Multigenerational Psychotherapy. (3)

Systemic theories and strategies to diagnose and treat specific problems in dysfunctional families. For marriage and family therapy majors only.

654. Issues of Gender and Ethnicity. (3)

Gender, ethnic, and minority issues in family systems, society, and clinical practice as they relate to individual, marital, and family treatment.

655R. Intermediate Practicum in Marriage and Family Therapy. (2-3)

Prerequisite: FamSc 555R, 650, or equivalent.

Experience in counseling individuals, premarital and marital dyads, families, groups of dyads, and multiple families. For marriage and family therapy majors only.

656. Ethical, Legal, and Professional Issues for Family Therapists. (3)

For marriage and family therapy majors only.

660.(FamSc-Soc) Parent-Child Interaction. (3)

Developing and testing conceptual models of parent-child interaction.

662. Human Ecology in Developing Countries. (3) On demand.

Interdisciplinary seminar on problems common to families in Third World countries and current approaches to basic needs.

663.(FamSc-Soc 565) The Individual and Family in Later Years. (3)

Developmental aspects of aging, focusing on the biophysical, cognitive, social, affective, and pathological dimensions in people aged 50 and over.

665. Philosophy in Family Life Education. (3)

Prerequisite: FamSc 310, 460, or instructor's consent.

Interpretive framework in human science that addresses quality of life in families.

675. Human Resource Allocation and Development. (3)
Prerequisite: FamSc 540, 570, or instructor's consent.

Influence of family decisions and economic factors in creation and use of human resources. Interaction of family decision making and public policy programs on human resource development.

676. Organization and Administration of Home Economics Education Programs. (3)

678. Home Economics Cross-cultural Field Experience. (1-3) On demand.

Supervised in-field experience to plan, implement, and evaluate a project or assist in an ongoing program.

689. Theoretical Foundations in Home Economics. (3)

Social and educational forces that affect individuals, families, and the professions of home economics and family life education.

692R. (FamSc-Soc) Seminar in Family Relationships. (1-3)

Premarital dyad, marital dyad, and issues in family interaction and familial roles.

693R. Independent Readings. (1-3)

699R. Master's Thesis. (6-9)

750R. Supervising Marriage and Family Therapy. (2)

Spring term focuses on theory, research, and practice of supervising marriage and family therapists. Summer term includes supervised experience. For doctoral marriage and family therapy majors only.

751. Advanced Theory in Marriage and Family Therapy. (3)

Advanced family therapy approaches to the diagnosis and treatment of affective, behavioral, and cognitive disorders. For doctoral marriage and family therapy majors only.

752. Addictions and Family Violence. (3)

Assessment and treatment of multiple-problem family systems, emphasizing addictions and abuse. For doctoral marriage and family therapy majors only.

753. Advanced Clinical Specialization in Marriage and Family Therapy. (3)

Advanced approaches in treating dysfunctional individual, marital, and family systems. For doctoral marriage and family therapy majors only.

755R. Advanced Practicum in Marriage and Family Therapy. (2-3)

Prerequisite: FamSc 650, 655R, or equivalent.

For doctoral marriage and family therapy majors only.

770R. Clinical Internship. (1)

Full-time family therapy training and practice at an approved agency.

791R. Seminar in Human Development. (1-2)

Prerequisite: must be a PhD candidate in human development.

792R.(FamSc-Soc) Family Symposium. (0.5)

Presentation and discussion of professional papers about the family.

793R. Research Seminar in Marriage and Family Therapy. (1-3)

Integrating and applying research design and statistics to the study of marital and family therapy. For doctoral majors in marriage and family therapy only.

794R. Special Topics in Child Development. (1-2)**799R. Doctoral Dissertation. (1-9)****Family Studies—Interdepartmental Program**

Coordinator: Thomas B. Holman, 1042 SWKT, 378-6704

The Family Studies Interdepartmental Doctoral Program is jointly sponsored by the Family Sciences and Sociology departments under the auspices of the College of Family, Home, and Social Sciences. Its purpose is the academic preparation and development of family scholars. Students become conversant with the important theoretical and philosophical viewpoints guiding thinking in the family field; competent in the most important research and analytic methods available to family scholars, including both quantitative and qualitative methods; and qualified to apply their learning to the strengthening of family relations as educators, researchers, and practitioners.

**Graduate Degree and Program
PhD Family Studies****Degree and Program Requirements****PhD Family Studies****Admission and Entry**

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 1 (U.S. and international)
- B. Entrance exam: GRE General Test.
- C. Sample of written work (i.e., master's thesis).

II. Prerequisite: Master's degree or equivalent.

Requirements for Degree

- I. Credit hours (66): Minimum 48 course work hours plus 18 dissertation hours (FamSc-Soc 799R).
- II. Required courses: FamSc-Soc 550; FamSc-Soc 560; FamSc 514; FamSc-Soc 600, 602, or 604; FamSc-Soc 603R; FamSc-Soc 692R (9 hours or 6 hours plus 660); FamSc-Soc 792R (4 hours); FamSc 799R; Soc 706 or equivalent.
- III. Additional courses:
 - A. Family Sciences Department option: As determined by the graduate faculty and advisory committee.
 - B. Sociology Department option: As determined by the graduate faculty and advisory committee.
- IV. Minor (optional): Any approved.
- V. Skill requirement: Consult department.
- VI. Sociology majors: Written examinations. Family science majors: Must pass an oral defense of the written comprehensive papers.
- VII. Dissertation.
- VIII. Examination: Oral defense of dissertation.

Food Science and Nutrition

Chair: Mark J. Rowe, 475 WIDB, 378-3912

Graduate Coordinator: Lynn V. Ogden, 467 WIDB, 378-6038

Faculty/Specialties**Professors**

Hill, John M. (1971) PhD, Rice University, 1965. Nutritional Biochemistry, International Nutrition. Huber, Clayton S., Dean (1976) PhD, Purdue University, 1968. Food Chemistry, Food Preservation, Food Processing.

Johnson, John Hal (1969) PhD, Ohio State University, 1963. Food Science, New Product Development, Shelf Life of Foods.

Rowe, Mark J. (1987) PhD, Brigham Young University, 1972. Molecular Biology, Mitochondrial Gene Expression.

Woolley, Bruce H. (1977) PharmD, University of Southern California, 1972. Pharmacology.

Associate Professors

Christensen, Merrill J. (1982) PhD, Massachusetts Institute of Technology, 1982. Selenium Metabolism, Molecular Biology.

Franz, Kay B. (1968) PhD, University of California, Berkeley, 1978. Human Nutrition, Mineral Absorption, Metabolism.

Ogden, Lynn V. (1984) PhD, University of Minnesota, St. Paul, 1973. Food Chemistry, Dairy Products, Food Processing, Sensory Analysis.

Pike, Oscar A. (1986) PhD, Purdue University, 1986. Food Chemistry, Lipid Oxidation, Food Processing and Storage.

Assistant Professors

Brown, Lora B. (1974) EdD, Brigham Young University, 1982. Point-of-Choice Nutritional Education.

Nyland, Nora K. (1982) PhD, Kansas State University, 1989. Dietetics, Institutional Management.

Graduate Degrees and Programs

MS Food Science

MS Nutrition

MS Molecular Biology (Interdepartmental Program)

Degree and Program Requirements*

MS Food Science

MS Nutrition

MS Molecular Biology (Interdepartmental Program)

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
Winter —June 30 (U.S. and international)
- B. Entrance examination: GRE General Test.
- C. For molecular biology in nutrition or food science, application should be made to the program in molecular biology designating nutrition or food science as the specialization of study.

II. Prerequisite:

- A. Undergraduate major in food science, nutrition, dietetics, or a closely related field.
- B. Undergraduate major in molecular biology in nutrition or food science or equivalent for molecular biology applicants.

Requirements for Degree

- I. Credit hours (30). Minimum 24 course work hours plus 6 thesis hours (FSN 699R).
- II. Required courses:
 - A. Food science program: FSN 652, 654, 656, 691R, Zool 503, Chem 481.
 - B. Nutrition program: FSN 531, 532, 631R, 691R; Zool 503 or Soc 600.
 - C. Molecular biology in nutrition or food science: Courses in A or B above plus Chem 582, 586; Stat 501 or 337; Mcbio 425; Mcbio 642 or Zool 526.
- III. Minor (optional): Selected with approval of faculty advisor.
- IV. Thesis: Standard university thesis format or journal publication format.
- V. Examination: Oral examination on course work and defense of thesis.

*Obtain a copy of the Graduate Student Handbook from department office (475 WIDB).

Program and Degree Resources

Western Dairy Food Research Center

Dairy Products Laboratory

Sensory Laboratory

Ezra Taft Benson Quality Assurance Laboratory

Food Science and Nutrition Graduate Courses

531. Advanced Human Nutrition 1. (3)

Prerequisite: FSN 435 or equivalent.

Nutritional status and basis of recommendations for carbohydrates, lipids, protein, and energy.

532. Advanced Human Nutrition 2. (3)

Prerequisite: FSN 435 or equivalent.

Nutritional status and basis of recommendations for vitamins, minerals, and water.

631R. Selected Topics in Food Science and Nutrition.

(1-3)

Prerequisite: FSN 531, 532, or instructor's consent.

Subjects that may be offered include:

- Current Controversies
- Diabetes
- Diet and Cancer
- Diet and Cardiovascular Disease
- Eating Disorders
- Food Additives
- Gerontology
- Minerals
- Nutrition Education
- Nutrition During Pregnancy and Infancy
- Obesity and Weight Control
- Protein
- Sports Nutrition
- Vitamins

638. Advanced Clinical Nutrition. (4)

Prerequisite: FSN 300, 356, 531, 532.

Theory, techniques, and practices.

639. Advanced Public Health Nutrition. (3)

Prerequisite: FSN 400, 531, 532.

Program planning, management, and evaluation.

652. Carbohydrates and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Sugars, higher saccharides, starches, pectins, gums, hemicelluloses, celluloses, and their derivatives: their functions and reactions in foods.

654. Proteins and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Plant and animal proteins and their functions and changes during food processing; food enzyme properties.

656. Food Lipids and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Lipids and their reactions in foods with other components of the food system and/or the surrounding environment; lipid processing techniques.

691R. Graduate Seminar. (1-2)

697R. Research. (1-3)

699R. Master's Thesis. (1-9)

French and Italian

Chair: Madison U. Sowell, 4002 JKHB, 378-2542.

Graduate Coordinator: Mark E. Bell, 4014 JKHB,

378-4484.

Faculty/Specialties

Professors

- Brown, Thomas H. (1960) PhD, University of Illinois, 1960. French Literature, Francophone, La Fontaine.
- Sowell, Madison U. (1979) PhD, Harvard University, 1979. Italian and Comparative Literature (Middle Ages, Renaissance), Descriptive Bibliography.
- Turner, Norman C. (1970) PhD, Syracuse University, 1962. French Literature (Twentieth-Century Novel, Camus).

Associate Professors

- Bush, Michael D. (1992) PhD, Ohio State University, 1983. Language Acquisition (Computer-assisted Learning).
 Lambert, L. Gary (1969) PhD, Rice University, 1969. French Literature (Seventeenth Century, Rousseau, Voltaire).

Assistant Professors

- Bell, Mark E. (1991) PhD, University of Utah, 1991. French Literature (Francophone), Literary Theory.
 Cottle, Michaela V. (1989) PhD, University of North Carolina, Chapel Hill, 1992. French Literature (Twentieth Century, Camus).
 Unlandt, Nicolaas G. W. (1989) PhD, University of Amsterdam, Holland, 1992. French Literature (Middle Ages, Old French, Provencal).

Graduate Degrees and Programs

- MA French Studies
 MA Language Acquisition (French)

Degree and Program Requirements**MA French Studies**

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
 Fall —February 28 (international)
 —April 1 (U.S.)
 Winter —June 30 (international)
 —September 1 (U.S.)
 - B. Entrance examination: GRE General Test.
- II. Prerequisite:
 - A. Baccalaureate degree in French or equivalent.
 - B. Advanced (American Council on Teaching of Foreign Languages [ACTFL] rating) French language proficiency.

Requirements for Degree

- I. Credit hours (30): Minimum of 24 course work hours plus 6 thesis hours (Fren 699R).
- II. Required courses:
 - A. Minimum of 12 credit hours in French.
 - B. Maximum of 12 credit hours in related fields such as comparative literature, humanities, linguistics, and romance philology.
- C. 6 hours of Fren 699R (thesis).
- III. Writing project: thesis or three-paper option.
- IV. Examination: comprehensive oral examination over course work and writing project.

MA Language Acquisition (French)

See Language Acquisition section of this catalog.

French Graduate Courses**670R. Tutorial Internship in French. (1-3)**

Individual research in cooperation with graduate faculty member in problems relating to French. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in French. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in French.

690R. Seminar in French. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in French.

699R. Master's Thesis. (1-6)**Geography**

Chair: Dale J. Stevens, 690-C SWKT, 378-3851
 Graduate Coordinator: Alan H. Grey, 690-F SWKT, 378-4116

Faculty/Specialties**Professors**

- Grey, Alan H. (1964) PhD, University of Wisconsin, Madison, 1963. New Zealand, General, Historical.
 Hudman, Lloyd E. (1970) PhD, University of Kansas, 1970. Urban Geography, Travel and Tourism.
 Jackson, Richard H. (1969) PhD, Clark University, 1970. North America, Culture, Planning.
 Stevens, Dale J. (1966) PhD, University of California, Los Angeles, 1969. Weather, Europe, Landforms.

Associate Professor

- Hinckley, Thomas K. (1972) PhD, University of Western Ontario, Canada, 1979. Cartography.

Assistant Professors

- Davis, James A. (1990) PhD, Arizona State University, 1993. Urban Planning and Cultural Geography.
 Emmett, Chad (1992) PhD, University of Chicago, 1991. Middle East, Political and Cultural Geography.
 Hardin, Perry J. (1988) PhD, University of Utah, 1989. Cartography, Geographic Information Systems, Remote Sensing.
 Shumway, J. Matthew (1991) PhD, Indiana University, 1991. Population and Economic Geography.

Graduate Degree and Program

- MS Geography

Degree and Program Requirements**MS Geography****Areas of Specialization**

- Cartography, Geography, Planning

This program is designed to provide a general background at the graduate level for either a terminal degree or preparation for more advanced work.

Admission and Entry

- I. Application requirements:
 - A. Semester of entry and application deadline:
 Fall —February 15 (U.S. and international)
 - B. GRE General Test scores must be received by February 15.
 - C. Minimum GPA3.0 for last 60 semester credits.
 - D. Three academic letters of recommendation and statement of intent describing field of interest and career goals.

- E. Decisions to admit made by mid-March.
- II. Prerequisite:
- A. Undergraduate minor in geography or equivalent.
 - B. Strong language background for area studies emphasis.
 - C. Business mathematics or statistics background for business or industry emphasis.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Geog 699R).
- II. Required courses: Geog 600R (2 credit hours; 1 taken fall; 1 taken winter), 601, 620, 699R.
- III. Recommended statistics course: Soc 606 (3).
- IV. No more than 7 hours total from cooperative education (see below), special problems, or readings courses may be applied toward the degree.
- V. Minor (optional): Supporting courses chosen in consultation with committee.
- VI. Thesis.
- VII. Examination: Oral defense of thesis.

Geography Graduate Courses

501R. Topics in Systematic Geography. (1-3)

Detailed investigation of selected systematic topics; emphasis on current world affairs and problems.

502R. Seminar in Regional Geography. (1-3)

512. Cartographic Reproduction. (3)

Prerequisite: Geog 312, 412.

Color map production using separations and precision registration for reproduction.

513.(Geog-CEn) Photogrammetry and Remote Sensing. (3)

Prerequisite: CEn 113.

Using data obtained from visible portion (photographs) and broader range (radiometers, radar, microwaves, infrared, remote, etc.) of electromagnetic spectrum to solve engineering problems. Maps, mapping procedures, and photo and electronic data interpretation.

515. Geographic Information Systems (GIS). (3)

Prerequisite: Geog 211.

Applying GIS techniques to solving geographic problems in natural and cultural environments, emphasizing planning and resource management.

517. Analytical Cartography. (4)

Prerequisite: CS 142, Geog 515.

Geocoding, spatial data representation, map-based transformations, and cartographic modeling.

580. Geography of the Developing World. (3)

Prerequisite: instructor's consent.

Analysis and description of the developing world from a spatial perspective; focus on current policy issues, theories, and management practices.

599R. Cooperative Education. (1-3)

On-the-job experience. No more than 3 hours in cooperative education may apply toward any one degree.

600R. Graduate Colloquium. (1)

Prerequisite: graduate standing.

Nature of geographical investigation and the problems of graduate work.

601. Seminar in Physical Geography. (2)

610. Planning: Analysis and Implementation. (2)

Prerequisite: Geog 310, 410.

Research seminar on planning theory; critical evaluating models and theories; uses a case study approach.

612. Seminar in Cartography and Geographic Information Systems. (2)

Prerequisite: Geog 515.

Integration of remote sensing, geographical information systems, photogrammetry, and field work for solving geographic mapping problems.

620. Seminar in Cultural Geography. (2)

690R. Readings. (1-2)

695R. Special Problems. (1-3)

699R. Master's Thesis. (1-6)

Geology

Chair: Dana T. Griffen, 258 ESC, 378-3918

Graduate Coordinator: Bart J. Kowallis, 274 ESC, 378-2467

Faculty/Specialties

Professors

Baer, James L. (1969) PhD, Brigham Young University, 1968. Geologic Engineering.

Benson, Alvin K. (1986) PhD, Brigham Young University, 1972. Geophysics.

Best, Myron G. (1965) PhD, University of California, Berkeley, 1961. Petrology, Tectonics.

Christiansen, Eric H. (1986) PhD, Arizona State University, 1981. Petrology, Geochemistry.

Griffen, Dana Thomas (1979) PhD, Virginia Polytechnic Institute, 1975. Mineralogy, Crystallography.

Kowallis, Bart J. (1982) PhD, University of Wisconsin, Madison, 1981. Structural Geology.

Mayo, Alan L. (1987) PhD, University of Idaho, 1981. Hydrogeology.

Miller, Wade E. (1971) PhD, University of California, Berkeley, 1968. Vertebrate Paleontology.

Petersen, Morris S. (1966) PhD, University of Iowa, 1962. Invertebrate Paleontology.

Associate Professors

Keith, Jeffrey D. (1990) PhD, University of Wisconsin, 1982. Economic Geology, Geochemistry.

Ritter, Scott M. (1991) PhD, University of Wisconsin, Madison, 1986. Invertebrate Paleontology, Carbo-nate Petrology.

Assistant Professor

Morris, Thomas H. (1990) PhD, University of Wisconsin, Madison, 1986. Sedimentology, Stratigraphy.

Graduate Degree and Program

MS Geology

Areas of Specialization

Earth Science Education, Environmental Geology, Geology

Degree and Program Requirements**MS Geology**

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
Winter —June 30 (international)
—September 1 (U.S.)
 - B. Entrance examination: GRE General Test. GRE scores must be received in the Geology Department before application for admission will be considered.
 - C. GPA: Minimum 3.0 GPA overall and in all physical sciences (mathematics, chemistry, computer science, physics) as well as in geology courses.
 - II. Prerequisite: Baccalaureate degree. Arrangements to satisfy undergraduate deficiencies will be made in consultation with graduate coordinator.
- Requirements for Degree
- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Geol 699R).
 - II. Required courses:
 - A. Geology: to be determined in consultation with advisor.
 - B. Environmental Geology: Geol 635, 636, 637; 12 hours from Geol 411, 435, 436, 521, 559, 560, 590R (approved by advisory committee), AgHrt 511, ChEn 411, CEEn 545, 550, 555, 641, 654, Hlth 454. Recommended: Stat 501, 502.
 - C. Earth Science Education: Geol 502, 697R (approved by advisory committee), ScEd 531; 6-9 hours from Geol 411, 435, 440, 445, 451, 460, 480; 6 hours from IS 551, 564, 620, 652, 661, ScEd 601. Any additional graduate courses in geology approved by advisory committee may be taken to satisfy remainder of 24 course work hours.
 - III. Publishable thesis.
 - IV. Examinations:
 - A. Comprehensive oral examination on course work.
 - B. Final oral defense of thesis.

Geology Graduate Courses**502. Geology for Teachers.** (2) On dem.

Prerequisite: Geol 101, 103; or 111, 112.

Materials and methods useful for junior and senior high school earth science teachers.

510. Conducted Field Trips. (1) F, W, Sp, Su

Prerequisite: any college-level geology course and instructor's consent.

Geology field trips.

511. Advanced Structural Geology. (3) Alt. F

Prerequisite: Geol 311, 410.

In-depth discussions of a variety of topics in structural geology, emphasizing current literature and problems.

520. Petroleum Geology. (3) Alt. F

Prerequisite: Geol 311, 370.

Origin, migration, and entrapment of liquid and gaseous hydrocarbons.

521. Borehole Geophysics and Geology. (3) Alt. F

Prerequisite: Phscs 105, 106; or 121, 122; Geol 351, 370.

Applied well log analysis, including conventional and new techniques. Subsurface geology and lithology determined from electrical, acoustical, radioactive, and other logs.

525. Basin Analysis. (3) F

Prerequisite: Geol 370.

Tectonic basin development, including extensional, compressional, flexural, and strike-slip processes. Processes of basin-fill and thermal histories emphasizing sequence and seismic stratigraphy.

545. Isotope Geochemistry. (3) Alt. W

Prerequisite: Geol 352.

Use of stable and radioactive isotope systematics in geochronology and investigation of origins of rocks and waters.

550. X-Ray Crystallography. (3) On dem.

Prerequisite: Geol 351, Phscs 221.

Theory and geologic applications of X-ray crystallography using both powder and single crystal X-ray diffraction methods.

551. Advanced Mineralogy. (3) Alt. W

Prerequisite: Geol 351, Phscs 221.

Crystallography, structure, and crystal chemistry of major silicate mineral groups.

552. Instrumental Methods. (4) Sp

Prerequisite: Geol 352, 451.

Modern laboratory methods for analyzing rocks and minerals; spectrometry, X-ray diffraction, electron microscopy.

556. Applied Geomathematics. (3) Alt. F

Prerequisite: Math 112, 113, Phscs 121, 122.

Applications of algebra, geometry, trigonometry, calculus, matrices, computers, and statistics to the analysis and interpretation of geoscience data.

559. Applied Geophysics 1. (3) Alt. F

Prerequisite: Geol 311, Phscs 221.

Principles, tools, and methods in gravity, magnetic, and electromagnetic exploration. Includes acquisition, processing, and interpretation of gravity and magnetic data.

560. Applied Geophysics 2. (3) Alt. W

Prerequisite: Geol 311, 559, Phscs 221.

Principles, tools, and methods used in seismic geophysics, with engineering, environmental, exploration, and hydrological applications. Includes acquisition, processing, and interpretation of seismic data.

561. Ore Deposits. (3) On dem.

Prerequisite: Geol 460.

Origin, classification, and distribution of metallic ore deposits.

574. Principles of Stratigraphy. (3) Alt. W

Prerequisite: Geol 370.

Study of the stratigraphic record using sequence and seismic stratigraphy, biostratigraphy, and radiometric dating techniques. Extended field trip required.

580. Principles of Paleontology. (3) Alt. W

Prerequisite: Geol 480.

Modern approaches to fossil study applied to areas of evolution, paleoecology, and biostratigraphy.

582. Biostratigraphy. (3) Alt. W

Prerequisite: Geol 480 or 580.

Fossils in their stratigraphic setting and principles of paleontologic chronology.

586. Vertebrate Paleontology. (4) Alt. F

Prerequisite: instructor's consent.

History of vertebrate fossils. Field trips required. Credit applies in either zoology or geology. Laboratory studies.

590R. Short Courses. (1-3) On dem.

Short graduate-level courses offered on a random basis.

591R. Seminar. (0.5) F, W

Seminars on various geologic topics by guest speakers. Total of 1 credit hour required.

599R. Cooperative Education. (1-9) F, W, Sp, Su

635. Advanced Hydrogeology. (3) Alt. F

Prerequisite: Geol 435, Math 321, or concurrent registration.

Equations governing fluid flow through saturated porous media under various geologic conditions; applying hydraulic characteristics to analysis of well and aquifer conditions.

636. Hydrogeochemistry. (3) On dem.

Prerequisite: Geol 435 or instructor's consent; Chem 106 and 107, or 112.

Nature and origin of solutes and isotopes in groundwater systems. Applying geochemistry to evaluation of groundwater recharge conditions and flow patterns.

637. Groundwater Modeling. (3) Alt. W

Prerequisite: Geol 435 or instructor's consent; Chem 106 and 107, or 112.

Computer modeling and groundwater systems.

655. Igneous Petrology. (3) On dem.

Prerequisite: Geol 552.

Origin and crystallization behavior of magmas, emphasizing crystal-liquid relations in simple experimental systems.

671. Sedimentary Petrology—Carbonate Rocks. (3) On dem.

Prerequisite: Geol 370.

Characteristics and significance of limestones and dolomites.

672. Sedimentary Petrology—Clastic Rocks. (3) Alt. W

Prerequisite: Geol 370.

Characteristics of conglomerates, sandstones, and shales. Provenance studies of various terrains by thin section analysis. Extended field trip required.

695R. Research. (1-4) F, W, Sp, Su

696R. Readings and Conferences in Geology. (1-4) F, W, Sp, Su

697R. Directed Field Studies. (1-6) F, W, Sp, Su

699R. Master's Thesis. (6-9) F, W, Sp, Su

Germanic and Slavic Languages

Chair: Alan F. Keele, 4096 JKHB, 378-3153

Graduate Coordinator: Scott Abbott, 4086 JKHB, 378-3207

Faculty/Specialties

Professors

Browning, Gary L. (1974) PhD, Harvard University, 1974.

Russian Literature (Nineteenth- and Twentieth-Century Writers).

Davis, Garold Neil (1968) PhD, Johns Hopkins University, 1962. German Literature (Romanticism, Realism, *Heimatdichtung*, Goethe's *Faust*).

Jarvis, Donald K. (1970) PhD, Ohio State University, 1970. Russian Language (Pedagogy, Testing).

Jones, Randall L. (1978) PhD, Princeton University, 1970. German Language (Technology and Second-Language Acquisition, Testing), Pedagogy.

Keele, Alan F. (1971) PhD, Princeton University, 1971. German Literature (Earlier Twentieth Century, 1945-Present).

Kelling, Hans-Wilhelm (1962) PhD, Stanford University, 1967. German Literature (*Goethezeit*), Cultural History, Pedagogy.

Plummer, Thomas G. (1985) PhD, Harvard University, 1972. German Literature (Weimar Period), German Film.

Rogers, Thomas F. (1969) PhD, Georgetown University, 1968. Russian Literature (Twentieth-Century Drama), Film.

Associate Professors

Abbott, Scott (1988) PhD, Princeton University, 1979. German Literature (Eighteenth, Nineteenth, Twentieth Centuries), Literary Theory.

Baker, Joseph O. (1967) PhD, Tulane University, 1968. German Literature (Kleist, Realism).

Hart, David Kay (1984) PhD, University of Washington, 1979. Russian Language (Phonology, Morphology, Syntax).

Assistant Professors

Davis, William Stephen (1989) PhD, Stanford University, 1989. Goethe, Eighteenth Century, Lyricism, Literary Theory.

Lund, Randall J. (1988) PhD, University of Minnesota, 1986. Foreign Language Methodology, Teacher Education, Second Language Acquisition.

Stott, Michelle (1988) PhD, University of Utah, 1987.
Lessing, Kierkegaard, Eighteenth Century, Women's Studies.

Graduate Degrees and Programs

- MA German Literature
MA Language Acquisition (German, Russian, or Scandinavian)

Degree and Program Requirements

MA German Literature

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—April 1 (U.S.)
Winter	—June 30 (international)
	—August 1 (U.S.)
 - B. Entrance examination: GRE General Test.
- II. Prerequisite:
 - A. Baccalaureate degree in German or in a related field such as English, comparative literature, humanities, etc. Minor deficiencies in German linguistics, culture, or other background areas may be made up by enrolling in appropriate undergraduate courses.
 - B. German language proficiency in all four skills at the advanced level as defined by the American Council on Teaching of Foreign Languages (ACTFL)—equivalent to the Interagency Language Roundtable (ILR) level 2.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Germ 699R).
- II. Required courses:
 - A. CLit 610 (3 hours).
 - B. 3 hours from CLit 620R, 630R, 640R, 650R, 660R (should be a German-related topic; see graduate advisor before registering).
 - C. 18 hours of German graduate courses.
 - D. 6 hours of Germ 699R (thesis).
- III. A reading knowledge of a second foreign language (fourth semester or equivalent).
- IV. Examination: Oral examination on reading list (see graduate advisor), course work, and thesis.

MA Language Acquisition (German, Russian, Scandinavian)

See Language Acquisition section of this catalog.

German Graduate Courses

- 615. Applied German Linguistics.** (3) On demand.
Prerequisite: Germ 360, 450, or equivalent.
Applying linguistics to the problems of teaching German grammar.

640R. German Literary Periods and Movements. (3)

In-depth study of a period or movement such as medieval, Renaissance, baroque, eighteenth century, Romanticism, realism, fin-de-siècle Vienna, naturalism, 1890–1945, 1945–present.

641R. Studies in German Literary Genres. (3)

In-depth study of a genre such as drama, novel, novella, lyric, film.

642R. Major German Authors. (3)

In-depth study of one author such as Lessing, Goethe, Schiller, Kleist, Storm, Rilke, Brecht, Mann, Kafka, Hofmannsthal, etc.

670R. Tutorial Internship in German. (1–3)

Individual research in cooperation with graduate faculty member in problems relating to German. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in German. (1–3)

Individual study supervised by graduate faculty member in varying topics of specific interest in German.

690R. Seminar in German. (3)

Group studies supervised by graduate faculty member in varying topics of specific interest in German.

699R. Master's Thesis. (1–6)

Russian Graduate Courses

670R. Tutorial Internship in Russian. (1–3)

Individual research in cooperation with graduate faculty member in problems relating to Russian. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Russian. (1–3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Russian.

690R. Seminar in Russian. (1–3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Russian.

699R. Master's Thesis. (1–6)

Scandinavian Studies Graduate Courses

529. Old Norse—Icelandic. (3)

Recommended: knowledge of a modern Scandinavian language.

670R. Tutorial Internship in Scandinavian. (1–3)

Individual research in cooperation with graduate faculty member in problems relating to Scandinavian. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Scandinavian. (1–3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Scandinavian.

690R. Seminar in Scandinavian. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Scandinavian.

699R. Master's Thesis. (1-6)

Health Sciences

Chair: Keith J. Karren, 213 RB, 378-4428

Graduate Coordinator: Richard Hurley, 229-D RB,
378-2360

Faculty/Specialties

Professors

- Burgener, O. Robert (1964) PhD, University of Utah, 1972. Community Health, Environmental Health.
Hafner, Brent Q. (1969) PhD, Southern Illinois University, 1969. Behavioral Health, Research.
Heiner, Steven W. (1969) EdD, University of Utah, 1969. Gerontology, Social Hygiene.
Karren, Keith J. (1971) PhD, Oregon State University, 1975. Behavioral Health.
Rhodes, Ronald L. (1962) PhD, Oregon State University, 1971. Health Promotion, Physiology.
Rollins, L. McKay (1962) PhD, University of Utah, 1971. International Health, Administration, School Health.
Thygeson, Alton L. (1967) EdD, Brigham Young University, 1969. Injury Prevention.

Associate Professor

- Hurley, D. Richard (1971) PhD, Southern Illinois University, 1971. Statistics, Research, Substance Abuse.

Assistant Professor

- Salazar, Richard D. (1963) PhD, Southern Illinois University, 1972. Research Methods, Statistics.

Graduate Degree and Program

MS Health Sciences

Degree and Program Requirements

MS Health Sciences

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —March 1 (U.S. and international)
- B. Entrance examination: GRE General Test.
- C. GPA: Minimum of 3.0 for last 60 hours of undergraduate work.

II. Prerequisite:

- A. Baccalaureate degree with a major or minor in community health, health education, health promotion, biological sciences, nursing, physical education, therapeutic recreation, or other allied fields.
- B. Applicants will be required to satisfy any deficiencies. Courses taken in doing so will not count toward the required hours for the degree.

Requirements for Degree

I. Credit hours:

- A. Master of science (MS thesis) (31): Minimum 25 course work hours plus 6 thesis hours (Hlth 699R).

- B. Master of science (MS project) (36): Minimum 30 course work hours plus 6 project hours (698R).

- II. Required core courses in all emphases: Stat 552; Hlth 650, 651, 692, 694.

- III. Required courses in various emphases:

A. Community health:

- MS thesis: Hlth 430, 478, 652, and 6 course work hours plus 6 thesis hours (699R);
MS project: Hlth 430, 478, 652, and 11 course work hours plus 6 project hours (698R).

B. School health:

- MS thesis: Hlth 652, 661, 665, and 6 course work hours plus 6 thesis hours (699R);
MS project: Hlth 652, 661, 665, and 11 course work hours plus 6 project hours (698R).

C. Health promotion:

- MS thesis: Hlth 455, 599R, 665, and 7 course work hours plus 6 thesis hours (699R);
MS project: Hlth 455, 599R, 665, and 12 course work hours plus 6 project hours (698R).

- IV. Thesis or project: Hlth 692 and Stat 552 should be taken the first semester or as early as possible in preparation for the thesis or project.

- V. Examinations: Oral defense of thesis or project.

Health Sciences Graduate Courses

599R. Cooperative Education. (Arr.)

Prerequisite: completion of a major in health sciences or graduate student status in health sciences.
On-the-job experience.

603R. Health Problems Workshop. (1-7)

Current problems in school and community health.

650. Review and Processing of Health Information. (3)

Source evaluation and content review of contemporary research in health sciences.

651. Community Organization for Health. (2)

Theory and practices in community organization for health. Evaluating group work methods and leadership theories. Field observations required.

652. Health Education Program Planning. (2)

Principles of health education program design, administration, marketing, and evaluation.

661. Curriculum Development and Instructional Design. (2)

Design and evaluation of health education curricula.

665. Behavioral Health. (2)

Analysis of current research and theory concerning health behaviors and psychological factors in the cause, prevention, development, and treatment of physical and behavioral illness and disorders.

666. Health and Aging Process. (2)

Advanced theories of the normal and pathological aging process, including health promotion and extension of life.

671. Graduate Practicum. (1)

Role and functions of the college health teacher. Supervised experience in teaching and research.

692. Research Methods in Health Sciences. (3)

Designing, analyzing, and writing research, focusing on methodological skills.

694. Graduate Seminar in Health Sciences. (2)**696R. Independent Studies. (1-3)****698R. Master's Project. (4)****699R. Master's Thesis. (1-9)****History**

Chair: Kendall Brown, 323 KMB, 378-4335

Graduate Coordinator: Malcolm R. Thorp, 309 KMB, 378-3234

Faculty/Specialties**Professors**

Alexander, Thomas G. (1964) PhD, University of California, Berkeley, 1965. Late Nineteenth- and Twentieth-Century United States, Western America, Mormon History.

Britsch, R. Lanier (1966) PhD, Claremont Graduate School, 1967. Asian Religions, Missiology.

Fox, Frank W. (1971) PhD, Stanford University, 1973. Modern U.S., U.S. Cultural History.

Gowans, Frederick R. (1972) PhD, Brigham Young University, 1972. Western America, American Indian, Fur Trade.

Green, Arnold H. (1985) PhD, University of California, Los Angeles, 1973. Modern Near East.

Johnson, G. Wesley (1984) PhD, Columbia University, 1967. Africa, Public.

Montgomery, David C. (1970) PhD, Indiana University, Bloomington, 1971. Central Asia, Middle East, Central Asian and Middle Eastern Languages.

Pixton, Paul B. (1974) PhD, University of Iowa, 1972. Medieval Europe.

Pratt, David H. (1966) PhD, University of Nebraska, Lincoln, 1975. British Family, Modern English.

Thorp, Malcolm R. (1969) PhD, University of Wisconsin, Madison, 1972. Early Modern and Modern Britain.

Tobler, Douglas F. (1967) PhD, University of Kansas, 1967. Modern Germany, European Intellectual History.

Walker, Ronald W. (1980) PhD, University of Utah, 1977. American Religious History, Utah History.

Warner, Ted J. (1962) PhD, University of New Mexico, 1963. Spanish and Mexican Borderlands, American Indian, Western America.

Associate Professors

Bohac, Rodney D. (1983) PhD, University of Illinois, 1982. Russia, Rural Europe.

Hamblin, William (1990) PhD, University of Michigan, 1985. Middle East.

Harline, Craig H. (1992) PhD, Rutgers, 1986. Early Modern Europe.

Holmes, Blair R. (1971) PhD, University of Colorado, 1972. European Family, Social History.

Kenzer, Robert C. (1982) PhD, Harvard University, 1982. Family, Nineteenth-Century America—South.

Madsen, Carol Cornwall (1980) PhD, University of Utah, 1985. Women's History, American History.

Richards, Mary Stovall (1983) PhD, University of Chicago, 1983. Family, Nineteenth-Century America—South, Twentieth-Century Southern Novelists.

York, Neil Longley (1977) PhD, University of California, Santa Barbara, 1978. Colonial History, Technology, American Revolution.

Assistant Professors

Cannon, Brian Q. (1992) PhD, University of Wisconsin, 1992. American Rural History.

Westover, V. Robert (1971) PhD, Arizona State University, 1979. Family, American Indian.

Graduate Degrees and Programs

MA, PhD History

The Department of History at Brigham Young University offers both the MA degree and the PhD degree in selected fields of strength, particularly those of European intellectual, American social, western American, Mormon, family, community, and public history. Opportunity is provided for those whose primary career objectives are directed toward teaching at the secondary level, specialized research and teaching at the college/university level, or employment in the nonacademic sector. Students desiring a master's degree in Latin American, Asian, or Middle Eastern history should apply to the relevant program in the David M. Kennedy Center for International Studies.

Graduate Degree and Program Requirements**MA History**

Areas of emphasis are American or European history.

Admission and Entry**I. Application requirements:**

A. Semesters of entry and application deadlines:
Fall —March 1 (U.S. and international)

B. At least three letters of recommendation from persons familiar with applicant's academic qualifications, preferably professors.

C. Sample of applicant's work: Send directly to the department a research paper such as a senior seminar paper.

D. Entrance examinations:

1. GRE General Test.
2. Students whose native language is not English must pass the TOEFL examination at the 85th percentile or higher (a score of 580).

E. GPA: Minimum of 3.0 for last 60 hours.

F. Inquire of the History Department for further details before applying for admission.

II. Prerequisite: Undergraduate degree in history or equivalent.

Requirements for Degree

- I. Course requirements:
 - A. American history emphasis. Credit hours (30): Minimum of 24 course work hours including Hist 587, 690R; two courses selected from Hist 561, 562, 563; plus 6 thesis hours (699R).
 - B. European history emphasis. Credit hours (30): Minimum of 24 course work hours including Hist 587, 690R; one or more courses selected from Hist 661, 662, 663; plus 6 thesis hours (699R).
 - II. Minor: Optional as approved by advisory committee.
 - III. Thesis.
 - IV. Examinations:
 - A. Written comprehensive.
 - B. Oral defense of thesis.
- PhD History**
Areas of emphasis are American or European history.
- Admission and Entry
- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —March 1 (U.S. and international)
 - B. At least three letters of recommendation from persons familiar with applicant's academic qualifications, preferably professors.
 - C. A copy of applicant's master's thesis, sent directly to the department.
 - D. Entrance examinations:
 1. GRE General Test.
 2. Students whose native language is not English are required to pass the TOEFL examination at the 85th percentile or higher (a score of 580).
 - E. GPA: Minimum 3.4 for last 60 hours.
 - F. Inquire of the History Department for further details before applying for admission.
 - II. Prerequisite: Master's degree in history or equivalent.

Requirements for Degree

The student should select either European history or American history as his or her major field. The other will become the secondary field. All students will be required to take the three American core courses, and one or more European courses depending on area of interest.

A student may specialize in an area within the major field as approved by the departmental graduate committee and the committee chair. Except in unusual cases, the fields of emphasis in American history are western America, history of religion in America, and American social history.

- I. Credit hours (54 beyond baccalaureate): Minimum 36 course work hours beyond the baccalaureate plus 18 dissertation hours (Hist 799R).
- II. Course requirements:
 - A. First year in residence: See current class schedule; consult with advisor.
 - B. Core courses for European history emphasis: Hist 661, 662, 663.

C. Core courses for American history emphasis: Hist 561, 562, 563.

D. Other courses to be determined by advisory committee.

III. Progress review: After 18 hours of course work, there will be an oral progress review in which the student's graduate committee will determine whether the student has proved competent to remain in the program. Students should finish all course work and tool requirements and pass the written comprehensive examinations within three years after beginning the program.

IV. Skill requirement: Consult department.

V. Dissertation prospectus: Presented upon successful completion of the oral comprehensive examination.

VI. Dissertation.

VII. Examinations:

- A. Written comprehensive examinations: A PhD candidate will offer for comprehensive examination a general field (major area), a field of specialization within that general field, and a secondary field in history. The candidate will also present a minor field outside history, chosen in consultation with the committee chair.
- B. Oral comprehensive examination: Given after student successfully passes the written comprehensive examination.
- C. Oral defense of dissertation.

Program and Degree Resources

Camilla Eyring Kimball Chair of Home and Family Life
Charles Redd Center for Western Studies and Lemuel H. Redd, Jr., Chair in Western History
Joseph Fielding Smith Institute for Church History
Museum of Peoples and Cultures
Women's Research Institute
Center for Studies of the Family

History Graduate Courses

500R. Special Studies in History. (1-3)

Directed by visiting or resident faculty. Check with department secretary for current topics and instructor.

561. Sources and Problems in Early America. (3)

Through the seventeenth and eighteenth centuries. Required of American and European history graduate students.

562. Sources and Problems in Nineteenth-Century America. (3)

Through the nineteenth century. Required of American and European history graduate students.

563. Sources and Problems in Twentieth-Century America. (3)

Through the twentieth century. Required of American and European history graduate students.

587. Philosophies of History. (3)

Fundamental problems and types of historical analysis and interpretation, philosophies of history, and work of outstanding historians.

590R. Special Topics. (3)

Western American, religious, family, Asian, Latin American, and Near Eastern history.

598R. Special Readings in History. (1-2)**661. Sources and Problems in Medieval, Renaissance, and Reformation History. (3)**

Selected topics in medieval, Renaissance, and Reformation history.

662. Sources and Problems in Early Modern Europe, 1550-1789. (3)

Selected topics in early modern Europe, 1550-1789. Part of the core curriculum for graduate students.

663. Sources and Problems in Modern Europe, 1789-Present. (3)

Selected topics in nineteenth- and twentieth-century Europe, 1789-present.

690R. Graduate Seminar in History. (1-3)**695R. Coordinated Research. (3)**

Student research directed by faculty member on topic of mutual interest. Prior approval of instructor required. Research assistants must do additional work for credit.

696R. Practicum in Public History and Family History. (1-5)

College credit for work in local archives, museums, and related areas. See department chair for openings available and to determine hours of credit.

698R. Master's Project. (1-6)**699R. Master's Thesis. (1-9)****798R. Special Readings in History. (1-2)****799R. Doctoral Dissertation. (1-18)**

Humanities, Classics, and Comparative Literature

Chair: John F. Hall, 3010-A JKHB, 378-4448

Graduate Coordinator: George S. Tate (Humanities),
3005 JKHB, 378-7687

Assistant Graduate Coordinator: Steven P. Sondrup
(Comparative Literature), 3003 JKHB, 378-2579

Faculty/Specialties**Professors**

Bassett, Arthur R. (1972) PhD, Syracuse University, 1975.
Humanities: American Humanities, Victorian Art and Culture.

Britsch, Todd A., Academic Vice President/Associate Provost (1966) PhD, Florida State University, 1966.
Humanities: Art and Society, Interrelations of Arts, Winckelmann, Technology and Culture.

Marshall, Donald R. (1971) PhD, University of Connecticut, 1971. Humanities: Film as Art, American Humanities, Creative Writing

Peer, Larry H. (1975) PhD, University of Maryland, College Park, 1969. Comparative Literature:
Romanticism, Theory.

Sondrup, Steven P. (1973) PhD, Harvard University, 1974.

Comparative Literature: Scandinavian, German Literature, Nineteenth and Twentieth Century.

Tate, George S. (1974) PhD, Cornell University, 1974.

Humanities and Comparative Literature: Medieval Studies (Scandinavian, German, English, Augustine, Twelfth-Century Renaissance).

Associate Professors

Butler, Terrell M. (1979) PhD, Cornell University, 1979.

Comparative Literature: Seventeenth-Century France, England, Italy.

Call, Michael J. (1983) PhD, Stanford University, 1982.

Humanities: Eighteenth- and Nineteenth-Century French Literature and Arts, Romanticism, Critical Theory.

Davis, Norma S. (1978) MA, Brigham Young University, 1975. Humanities: American Humanities, English Romanticism.

Green, Jon D. (1970) PhD, Syracuse University, 1972.
Humanities: Interrelations of the Arts, Modernism.

Hall, John F. (1978) PhD, University of Pennsylvania, 1984. Classics: Roman History, Religion, and Law; Latin Literature.

Lounsbury, Richard C. (1982) PhD, University of Texas, Austin, 1979. Classics: Early Imperial Literature, Rhetoric, Classical Tradition in European and American Literature.

Shumway, Larry V. (1975) PhD, University of Washington, 1974. Humanities: Asian Humanities, Ethnomusicology.

Assistant Professor

Duckwitz, Norbert H. O. (1969) PhD, University of Colorado, 1987. Classics: Latin Poetry, especially Augustan; Greek Poetry; Greek and Roman Mythology.

Graduate Degrees and Programs

MA Comparative Literature

MA Humanities

PhD (Minor) Comparative Literature

Classics

The classics graduate program has been temporarily furloughed. Until further notice no students will be accepted into the program and no 500- or 600-level courses will be offered.

Comparative Literature

Comparative literature is the study of literature in its totality and the study of the relationships between literature and other areas of knowledge.

Degree and Program Requirements**MA Comparative Literature****Admission and Entry****I. Application requirements:**

- A. Semesters of entry and application deadlines:
- | | |
|--------|------------------------------|
| Fall | —February 28 (international) |
| | —May 15 (U.S.) |
| Winter | —June 30 (international) |
| | —September 15 (U.S.) |
| Spring | —October 31 (international) |
| | —February 20 (U.S.) |
| Summer | —December 31 (international) |
| | —April 15 (U.S.) |

B. Entrance examination: GRE General Test

II. Prerequisite:

- A. Baccalaureate degree in literature.
- B. Thorough reading knowledge (300 level) of two of the three languages required for degree.

Requirements for Degree

- I. Credit hours (33): Minimum 27 course work hours plus 6 thesis hours (CLit 699R).
- II. Required courses: CLit 610, 6 hours of 620R (in two different periods), 6 hours from 630R, 640R, 650R, 660R, or 690R; and 699R.
- III. Electives: 12 hours of literature.
- IV. Language requirement: Thorough reading knowledge (300 level) of three languages, one of which must be German or French, and one of which may be English for students who choose to emphasize British, American, or other anglophone literature.
- V. Thesis.
- VI. Examination: Final oral examination and defense of thesis.

PhD Minor Comparative Literature

Requirements for Degree Minor

- I. Credit hours: Minimum 12 course work hours.
- II. Thorough knowledge of three literary traditions, one of which must be French or German, in two periods each.
- III. All readings done in original language.
- IV. Examinations: Written and oral examinations on areas of concentration. Students may be asked to demonstrate their facility with the languages relevant to their program during either or both of the examinations.

Comparative Literature Graduate Courses

590R. Directed Readings. (1–3)

Prerequisite: graduate coordinator's consent.

610. Methods of Study in Comparative Literature. (3)

Introduction to critical study of literature: critical methods and bibliography; linguistic foundations of literature; textual scholarship; literary history; transmission, theory, and criticism; genre theory; literature and other disciplines.

620R. Studies in Periods and Movements. (3)

Prerequisite: CLit 610 or concurrent registration.

Various literary periods, movements, etc., and problems of periodization. Topics vary.

630R. Studies in Literary Genres. (3)

Prerequisite: CLit 610 or concurrent registration.

Various genres (e.g., novel, epic, tragedy, lyric) and problems of genre. Topics vary.

640R. Studies in Themes and Types. (3)

Prerequisite: CLit 610 or concurrent registration.

Major literary themes (e.g., Faust, Don Juan, Ulysses, Arthur), types, motifs, and problems of literary typology. Topics vary.

650R. Studies in Literary Relations. (3)

Prerequisite: CLit 610 or concurrent registration.

Interrelations of national literatures and figures and of literature with other areas of knowledge (art, history, law, psychology, music, etc.). Topics vary.

660R. Studies in Literary Theory. (3)

Prerequisite: CLit 610 or concurrent registration.

Critical theories of literature and literary analysis. Topics vary.

670R. Tutorial Internship. (3)

Prerequisite: graduate coordinator's consent.

Individual research in cooperation with graduate faculty member, generally on problems relating to a specific national literature.

690R. Seminar in Comparative Literature. (3)

Prerequisite: CLit 610.

Problems in comparative literature. Course content varies from semester to semester.

699R. Master's Thesis. (1–9)

Prerequisite: graduate coordinator's consent.

Humanities

Widely used in the Renaissance, the term *humanities* (*humanitas* or *studia humanitatis*) refers to the study of human intellectual and artistic creativity. Humanities is both a general academic category (inclusive of literature, history, philosophy, and the history and criticism of art and music) and a discipline in its own right with a methodology for the critical study of intellectual history and aesthetics. Pursued as a major, the field offers students unusual latitude in developing a broad and full program in the liberal arts.

Program and Degree Requirements

MA Humanities

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 28 (international)
—May 15 (U.S.)

B. Entrance examination: GRE General Test.

II. Prerequisite:

- A. Baccalaureate degree in humanities. Applicants with degrees in art history, history, literature, music, or philosophy may also be admitted but may be required to make up deficiencies in preparation through additional interdisciplinary course work.

B. Completion of literature course in a foreign language beyond GE foreign language requirement.

Requirements for Degree

- I. Credit hours (33): Minimum 27 course work hours plus 6 thesis hours (Hum 699R).
- II. Required courses: Hum 610, 630; one course each from 620R, 650R, and 690R, plus one additional course from this group; 699R.
- III. Electives: 12 hours in literature, art, music, history, or philosophy. To qualify, courses must approach these disciplines from theoretical, critical, or historical perspectives. (No more than 6 of these hours may be in upper-division undergraduate courses.)
- IV. Thesis.
- V. Examination: Final oral examination that focuses on areas of concentration but also requires some general knowledge; thesis defense.

Humanities Graduate Courses

590R. Directed Readings. (1-3)

Prerequisite: graduate coordinator's consent.

610. Research Methods in Humanities. (2)

Prerequisite: instructor's consent.

Use of the library and secondary sources.

620R. Period Studies in the Humanities. (3)

Interdisciplinary study of literature, philosophy, and the arts of a particular period of cultural history. Topics vary.

630. Writing the Thesis Prospectus. (1)

Prerequisite: Hum 610.

Design and development of MA thesis prospectus.

650R. Movements in the Humanities. (3)

Interdisciplinary study of various movements in literature, philosophy, and the arts. Topics vary.

690R. Seminar in the Humanities. (3)

Interdisciplinary study of problems in the humanities (e.g., interrelationships among the arts, critical theory, and models of cultural history). Topics vary.

699R. Master's Thesis. (1-9)

Prerequisite: graduate coordinator's consent.

Instructional Science

Chair: Paul F. Merrill, 201 MCKB, 378-7072

Faculty/Specialties

Professors

- Bunderson, C. Victor (1991) PhD, Princeton University, 1965. Computers in Measurement and Instruction.
 Green, Edward E. (1972) EdD, Indiana University, Bloomington, 1972. Instructional Design.
 Harrison, Grant V. (1969) EdD, University of California, Los Angeles, 1969. Product Research.

- Merrill, Paul F. (1977) PhD, University of Texas, Austin, 1970. Instructional Strategies and Computer Applications to Education.
 Osguthorpe, Russell T., Associate Dean (1978) PhD, Brigham Young University, 1975. Research with Handicapped Students.

Spencer, Robert W. (1967) EdD, Brigham Young University, 1971. Computers in Education.

Van Mondfrans, Adrian P. (1971) PhD, University of Wisconsin, Madison, 1967. Evaluation Theory and Practice.

Associate Professors

Inouye, Dillon K. (1978) PhD, Stanford University, 1978. Productivity in Learning.

Sudweeks, Richard R. (1980) PhD, University of Illinois, 1978. Educational Measurement and Evaluation.

Williams, David D. (1980) PhD, University of Colorado, 1981. Naturalistic Evaluation, Research, Teacher Education.

Assistant Professor

Bunderson, Eileen D. (1991) PhD, Brigham Young University, 1983. Gender Issues in Science.

Graduate Degrees and Programs

PhD: Instructional Psychology

MS, PhD: Instructional Science

Areas of Specialization

PhD: Instructional Psychology, Instructional Science, Literacy Education, Second Language Acquisition

Department Mission

The mission of the Department of Instructional Science is to enhance learning by improving instruction and teaching. In partnership with others, the department will (1) search for knowledge that improves instruction; (2) apply knowledge and technology to solve instructional problems; and (3) empower students with knowledge and skills in instructional development, research, and evaluation.

Students in each degree program are required to take basic courses in the following areas of disciplined inquiry in instruction: design and development, research, measurement, and evaluation. They are also required to acquire collateral tools from other disciplines such as statistics, computer science, human resource management, and communications. Specialized courses are offered to deepen the candidate's knowledge and theoretical sophistication. Professional skills are developed through extensive project and internship experiences offered in the schools, church, home, and community.

Graduate Minors in Instructional Science

Master's and doctoral students in other departments wishing to take a minor in instructional science should consult with the instructional science faculty member appointed to their advisory committee in selecting the appropriate courses (9 hours of course work required for a master's minor, 12 hours for a doctoral minor).

Degree and Program Requirements

MS Instructional Science

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 20 (U.S. and international)
Winter —September 15 (U.S.)
Summer —September 15 (U.S. and international)
Fall semester and summer term entry recommended.
 - B. Entrance examination: GRE General Test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores.
 - C. Letter of intent.
 - D. Three letters of recommendation.
- II. Prerequisite: (6 hours) ELdr 517 or Engl 316; Comms 272, TecE 250 or IS 587.

Requirements for Degree

- I. Credit hours (32): Minimum 26 course work hours plus 6 thesis hours (IS 699R) or 6 project hours (698R).
- II. Required courses: (14 hours) IS 515R (Microcomputers in Schools), 564, 652, 672 or 662, and Stat 552.
- III. Specialization: 9 hours to be determined in consultation with advisory committee.
- IV. Internship: 3 hours (IS 680R).
- V. Thesis, 6 hours (IS 699R); or project, 3 hours (IS 698R).
- VI. Examinations: Oral defense of thesis or project.

PhD Instructional Psychology PhD Instructional Science

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 20 (U.S. and international)
Winter —September 15 (U.S.)
Summer —September 15 (U.S. and international)
Fall semester or summer term entry recommended.
 - B. Entrance examination: GRE General Test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores.
 - C. Letter of intent.
 - D. Three letters of recommendation.
- II. Prerequisite: (3 hours) ELdr 517, Engl 316, Ling 230 or 330.
- III. Foreign language and skill requirement: There are three options for completing this requirement depending on area of specialization:
 - A. Instructional science specialization: an equivalent of at least 18 hours in statistics and computer science.

B. Literacy education specialization: an equivalent of at least 14 hours of statistics and computer science and reading ability in one foreign language.

C. Second language acquisition specialization: an equivalent of at least 14 hours of statistics and computer science and at least intermediate proficiency in a second foreign language, demonstrated by test or by course work completed through the 202 level. (This means that students must have two languages in addition to English to complete this specialization.)

Requirements for Degree

- I. Credit hours (73): Minimum of 55 course work hours plus 18 dissertation hours (IS 799R).
- II. Required courses: (16 hours) IS 620 or Psych 560, and IS 564, 652, 661, and 672 or Psych 500R or Ling 600.
- III. Specialization: 18 hours as determined in consultation with advisory committee.
- IV. Internship: 12 hours (IS 680R).
- V. Three projects: 9 hours.
- VI. Residence: At least two consecutive 6-hour semesters on the BYU Provo campus.
- VII. Examinations:
 - A. Comprehensive written examination.
 - B. Oral defense of dissertation.
- VIII. Time limit: All requirements for the doctorate must be completed within an eight-year period.

Instructional Science Graduate Courses

515R. Microcomputers in Schools. (1-3)

Application of computer technology in the public schools; evaluation of educational software programs; use of computer tools; computer programming in LogoWriter.

551. Introduction to Quantitative Reasoning. (3)

Introduction to statistical reasoning and methodology. Emphasizes the meaning and use of quantitative methods in answering substantive questions of educational research and practice. Use of computer software packages.

560. Microcomputer Materials Production. (3)

Prerequisite: IS 286 or 515R (Microcomputers in Schools).

Designing, programming, and debugging educational applications of microcomputers using a high-level computer language.

564. Instructional Design. (3)

Identifying instructional problems; specifying objectives, instructional strategies, and media; analyzing learning outcomes; developing instructional materials and assessment instruments; validating instructional systems.

587. Audiovisual Production. (3)

Designing, producing, and using audio and visual instructional materials. Applying 35-mm photography and audio recording and mixing to education.

620. Principles of Learning. (3) F

Improving classroom learning through understanding underlying psychological principles and theories.

651. Quantitative Reasoning. (3)

Prerequisite: IS 551 or equivalent.

Use of analysis of variance and multiple regression/correlation in analyzing and interpreting results of educational research and evaluation.

652. Assessing Learning Outcomes. (4) W, Su

Prerequisite: IS 551 or Stat 552 or equivalent.

Selecting and constructing instruments and procedures for assessing affective, behavioral, and cognitive outcomes of education.

653. Measurement Theory. (3) F

Prerequisite: IS 651, 652, or equivalent.

Classical and modern models for measuring human attributes. Issues related to reliability, validity, item selection, scoring, standard setting, and test equating. Use of item response theory and generalizability theory.

654. Computers in Educational Measurement. (2–4) W

Prerequisite: IS 652 or instructor's consent.

Types of computerized measurement and assessment methods and item forms, as well as their development, delivery, and statistical theory.

657R. Measurement Project. (1–3) F, W, Sp, Su

Prerequisite: IS 651, 652.

Designing, conducting, and reporting a comprehensive measurement project.

660. Authoring of Interactive Video. (3) W

Prerequisite: IS 560, 564.

Designing, developing, producing, and authoring intelligent, interactive video courseware. Budgets, project steps, equipment systems, and authoring.

661. Evaluation in Education. (3) F, Su

Nature, purposes, and functions of educational evaluation in making judgments about teachers, instructional materials, academic programs, curricula, and school systems.

662. Evaluation of Instructional Products. (2) F

Prerequisite: Stat 552 or equivalent.

Formative and summative evaluation of replicable instructions/products and procedures.

663. Evaluation of Educational Programs and Curricula. (3) W

Prerequisite: IS 661 or instructor's consent.

Problems in designing, conducting, and reporting the results of program and curriculum evaluations.

664. Advanced Instructional Design. (3) W, Su

Prerequisite: IS 564.

Advanced laboratory in instructional system design, production, formative evaluation, packaging, and implementation. Systematic critical analysis of all phases of development.

665. Introduction to Instructional Video Production.

(3) F

Recommended: IS 286, 376.

Elements of student and product analysis, design, production, implementation, evaluation, and revision associated with use of video and print instructional systems.

667R. Evaluation Project. (1–3) F, W, Sp, Su

Prerequisite: IS 661.

Designing, conducting, and reporting a comprehensive project in evaluation.

672. Empirical Inquiry in Education. (3) W, Su

Prerequisite: IS 651 or equivalent.

Introduction to empirical research in education.

Emphasizes designing, conducting, analyzing, reporting, and evaluating.

673. Research Synthesis and Conceptualization. (3) F

Prerequisite: IS 672.

Survey of major research problems, questions, and theories that have been investigated in instructional science. Preparing critical, integrative synthesis of completed research; conceptualizing problems for further inquiry. Research prospectus required.

674R. Inquiry Methods. (1–3) W, Su

Prerequisite: IS 672 or instructor's consent.

Specific inquiry strategies for researching practical educational problems. Strategy studied varies from section to section.

—Naturalistic Inquiry in Education

—Quasi-experimental Studies

—Cost-Benefit Analysis in Education

—Meta-Analysis

—Theory Building and Modeling in Education

677R. Research Project. (1–3) F, W, Sp, Su

Prerequisite: IS 672.

Designing, conducting, and reporting a comprehensive project in research.

680R. Internship. (1–6) F, W, Sp, Su

Prerequisite: department's consent.

682. Project and Instructional Resource Management.

(3) Su

Managing research, development, and evaluation projects in public schools and higher education. Planning, budgeting, supervising, managing personnel, and scheduling.

687R. Development Project. (1–3) F, W, Sp, Su

Prerequisite: IS 564.

Designing, conducting, and reporting a comprehensive project in development.

690R. Seminar. (1–3)

Check current class schedule for seminar topics.

692R. Advanced Topics. (1–3)**693R. Directed Individual Study.** (1–3) F, W, Sp, Su

Prerequisite: instructor's consent.

698R. Master's Project. (1–6) F, W, Sp, Su**699R. Master's Thesis.** (1–6) F, W, Sp, Su

760R. Advanced Computer-based Instruction. (3) F
Prerequisite: IS 560.

Current issues, research, and applications of computer technology in education. Advanced programming.

790R. Advanced Seminar. (1-3) F, W, Sp, Su
Check current class schedule for seminar topics.

799R. Doctoral Dissertation. (1-9) F, W, Sp, Su
Prerequisite: completion of skill and project requirements. Formal report and defense of a substantive research topic designed to make an original contribution to knowledge in the field.

International Studies

David M. Kennedy Center for International Studies

Director: R. Lanier Britsch, 237 HRCB, 378-3377

Graduate Coordinator: Valerie Hudson, 237 HRCB, 378-3560

American Studies Graduate Coordinator: Richard Cracraft, 222 HRCB, 378-3077; 3181 JKHB, 378-3082

Asian Studies Graduate Coordinator: Paul Hyer, 204 HRCB, 378-4957

International Development Studies Graduate Coordinator: Christopher B. Meek, 781 TNRB or 141 HRCB, 378-6827

International Relations Graduate Coordinator: Valerie Hudson, 237 HRCB, 378-3560

Ancient Near Eastern Studies Graduate Coordinator: Arnold H. Green, 211 HRCB, 378-3610; 418 JKHB, 378-3408.

International Business Joint Degree Graduate Coordinator: Lee Radebaugh, 664 TNRB, 378-4368

Graduate Degree and Program

MA International and Area Studies

The David M. Kennedy Center offers an interdisciplinary master of arts degree in international and area studies. Students select one of five different areas of emphasis: American studies, Asian studies, international development studies, international relations, Near Eastern studies (ancient).

Course work is tailored to suit the student's individual interests and career direction, and the program is multidisciplinary. Each discipline is organized differently, but most have a flexible curriculum.

The MA program requires 32 semester credit hours (8 required, 18 electives, 6 thesis) and is to be completed in one calendar year of full-time study.

Students with graduate degrees in international studies may pursue a wide range of careers, including government, international business and banking, public and private international agencies, teaching, research, and law. The broad liberal arts background acquired as part of an MA degree will be useful in nearly any professional field.

The MA in international and area studies is a strong preparation for doctoral study, law, or professional business schools. It may also serve to add an international dimension to a technical or vocational undergrada-

uate degree, thereby giving the graduate who has international interests an edge in the career market. The MA is not, however, generally considered an ideal terminal degree for international business. Placement in international careers is highly competitive and often requires practical job skills in addition to the master of arts degree. Academic and career objectives should be carefully weighed to determine whether the MA degree will enhance graduate career opportunities.

Degree and Program Requirements

MA International and Area Studies

Admission is handled through the BYU Office of Graduate Studies. Application forms can be requested from Graduate Admissions, B-356 ASB, Provo, UT 84602.

Applicants should complete all parts of the application form required by the university, with appropriate fees and transcripts, and indicate the department as International and Area Studies, code 570168. The chosen area of emphasis should be entered on the application form where a major is requested.

Before applying, interested persons may make an appointment with the director of graduate studies to evaluate the usefulness of an international studies degree for their career goals. Request general application information from the graduate secretary. Both persons can be reached at the David M. Kennedy Center, 237 HRCB, BYU, Provo, UT 84602, (801) 378-2389.

Admission and Entry

I. The program is extremely competitive, and enrollment is limited to 20.

II. Application requirements:

A. Semesters of entry and application deadlines:
Fall —February 1 (international)
—April 1 (U.S.)

B. Entrance examination:

1. GRE General Test: An official copy of the test scores must be submitted to Graduate Admissions (B-356 ASB), and scores should be indicated on Part D of the application form.

2. Prelaw applicants may submit LSAT.

3. Concurrent MBA applicants may submit GMAT; score subject to review.

4. International applicants: TOEFL required in addition to one of the preceding tests; minimum score of 580.

C. GPA: Minimum of 3.2.

D. Statement of intent: Indicate past intercultural experience, career goals, current professional skills, and how degree will be applied. Indicate probable topic of research for the thesis.

E. Three letters of recommendation from persons who can comment on applicant's academic ability, motivation, and interpersonal skills.

- F. Before entry into the program, students are encouraged to have had a meaningful international experience through participation in a university-sponsored program such as Study Abroad, the Washington Seminar, or an international internship.
- III. Prerequisite:
- Baccalaureate degree.
 - Undergraduate background in a relevant field, or satisfied deficiency.
 - Competency in a foreign language approved by committee chair 16 undergraduate credit hours including a 300-level conversation course; or other evidence of conversational fluency. (Not required for American Studies emphasis.)
- IV. Financial aid application deadline: April 1. The following financial aid available:
- Supplementary awards, which pay full or partial tuition for qualified students, awarded on basis of academic standing.
 - Research assistantships, paid positions requiring from 5 to 10 hours of work per week.
 - Research grant monies, awarded on basis of proposal merit and topic.

Requirements for Degree

- Credit hours (32): Thesis program (8 required, 18 electives, 6 thesis); nonthesis program—Near Eastern Studies (ancient)—31 course work hours.
- Required course work: IAS 501R (fall and winter), PISc 680 (fall), subfield core readings seminar (fall), selected methodology seminar (fall or winter), IAS 699R (6 thesis hours, spring or summer). The subfield core readings seminar, the selected methodology seminar, and all electives are to be determined in consultation with the subfield coordinator or the thesis advisor. There may be additional required courses for a particular emphasis. Please contact emphasis coordinator.
- International experience encouraged: Study Abroad, Washington Seminar, International Internship.
- Thesis.
- Examination: Oral examination on course work along with oral defense of thesis or research papers.

Joint Degree Program

The David M. Kennedy Center and the Marriott School of Management have a special program whereby a student can earn an MBA degree and an MA degree in international and area studies concurrently, completing both degrees in a minimum of two and one-half years.

Separate and complete applications must be submitted to both the David M. Kennedy Center and the Marriott School of Management; however, only one Honor Code Commitment and Confidential Report (Part B of application) is required.

International and Area Studies Graduate Courses

501R. Graduate Colloquium. (1)

Methodologies and reading. Preparation for writing competency requirements and research paper presentation. Required of all international and area studies master's candidates.

Studies based on individual and program needs.

599R. International Internship. (1-9)

Professional-level internship in an international setting. Class must be coordinated through Study Abroad.

695R. Directed Individual Studies. (1-3)

697R. Seminar in International Studies. (1-3)

699R. Master's Thesis. (1-6)

Language Acquisition

Graduate Coordinator: Randall Lund, 4088 JKHB, 378-4961

Language acquisition is a collegewide program in the College of Humanities.

Graduate Degree and Program

MA Language Acquisition

Areas of Specialization

Arabic, Chinese, French, German, Japanese, Korean, Portuguese, Russian, Scandinavian

Degree and Program Requirements

MA Language Acquisition

Admission and Entry

I. Application requirements:

A. Semesters of entry and application deadlines:
Fall —February 20 (U.S. and international)

B. Entrance examinations:

- GRE General Test.
- Fifteen-minute interview in the language of specialization addressing applicant's academic goals. May be completed in person, by telephone, or on tape in conversation with a second party.

II. Prerequisite: Baccalaureate degree and strong background in the language of specialization.

Requirements for Degree

- Credit hours (33): Minimum 27 course work hours plus 6 thesis hours (699R).
- Required courses: Ling 540, 600, 641, 660, 677.
- Departmental specialization: 3 hours of advanced linguistic study of the language of specialization, plus 9 hours as approved by the advisory committee for a total of 12 hours.
- Language requirement: Reading and speaking ability (202 level) in language other than English in addition to language of specialization.
- Thesis: 6 hours of 699R in language of specialization.
- Examination: Oral defense of thesis.

Law**J. Reuben Clark Law School****Faculty/Specialties****Professors**

- Backman, James H. (1973) JD, University of Utah, 1972. Banking Law; Consumer Law; Land Use Planning; Real Estate Transactions; Real Property.
- Burns, Jean Wegman (1986) JD, University of Chicago, 1973. Antitrust; Commercial Law; Conflicts of Laws.
- Davis, Ray Jay (1981) JD, Harvard University, 1953. Torts, Water Rights, Workers' Compensation.
- Durham, W. Cole, Jr. (1976) JD, Harvard University, 1975. Comparative Law; Constitutional Law; Criminal Law; Jurisprudence.
- Farmer, Larry C. (1977) PhD, Brigham Young University, 1975. Computer-based Expert Systems in Law Practice; Law and Behavioral Science; Law and Psychiatry; Legal Interviewing and Counseling; Negotiation.
- Fleming, J. Clifton, Jr., Associate Dean (1974) JD, George Washington University, 1967. Business Planning; Corporate Finance; Estate Planning; Federal Taxation.
- Floyd, C. Douglas (1980) LL.B., Stanford University, 1967. Civil Procedure; Federal Courts; Civil Rights; Antitrust.
- Gedicks, Frederick M. (1990) JD, University of Southern California, 1980. Business Associations; Law and Religion; Securities Regulation; Constitutional Law.
- Goldsmith, Michael (1985) JD, Cornell University, 1975. Criminal Law; Criminal Procedure; Evidence; RICO.
- Gordon, James D., III (1984) JD, University of California, Berkeley, 1980. Contracts; Securities Regulation.
- Hafen, Bruce C., Provost (1971) JD, University of Utah, 1967. Constitutional Law; Education Law; Family Law.
- Hansen, H. Reese, Dean (1974) JD, University of Utah, 1972. Director, Clinical Studies. Wills, Estates, and Trusts; Estate and Gift Tax.
- Kimball, Edward L. (1973) SJD, University of Pennsylvania, 1962. Evidence; Criminal Justice Administration; Criminal Law; Criminal Trial Practice.
- Lee, Rex E., President (1971) JD, University of Chicago, 1963. Antitrust; Appellate Advocacy; Constitutional Law.
- Lundberg, Constance K., Associate Dean (1982) JD, University of Utah, 1972. Environmental Law; Federal Courts; Natural Resources; Interviewing and Counseling.
- Neelman, Stanley D. (1978) JD, University of Denver, 1972. Wills and Estates; Taxation.
- Thomas, David A. (1974) JD, Duke University, 1972. Federal Jurisdiction; Legal Bibliography; Legal History; Legal Research and Writing; Real Property.
- Wardle, Lynn D. (1978) JD, Duke University, 1974. Biomedical Ethics and Law; Civil Procedure; Conflict of Laws; Family Law.
- Welch, John W. (1980) JD, Duke University, 1975. Agency and Partnerships; Corporate Finance; Corporations; Federal Taxation.

Whitman, Dale A. (1991) LLB, Duke University, 1966.

Property; Real Estate Finance; Land Use Planning.

Wilkins, Richard G. (1984) JD, Brigham Young University, 1979. Antitrust; Civil Procedure; Federal Courts; Civil Rights.

Williams, Gerald R. (1973) JD, University of Utah, 1969.

Contracts; Insurance; Law and Society; Office Practice.

Remedies; Legal Negotiation and Settlement.

Wood, Stephen G. (1976) JD, University of Utah, 1969; JSD, Columbia University, 1980. Administrative Law; Civil Rights; Collective Bargaining; Comparative Law; International Transactions; Labor Law.

Worthen, Kevin J. (1987) JD, Brigham Young University, 1982. Torts; Environmental Law.

Associate Professors

Dominguez, David (1989) JD, University of California, Berkeley, 1980. Criminal Law; Negotiations; Labor Law.

Preston, Cheryl Bailey (1989) JD, Brigham Young University, 1979. Debtor-Creditor Rights; Gender and Law; Commercial Law; Lender Liability.

Graduate Degrees and Programs

LLM Comparative Law

JD Law

Students admitted to the highly competitive programs of the Law School receive a breadth and depth of training that prepares them to function in the wide range of activities that occupy the professional lawyer's life. Students gain firsthand experience with a variety of teaching and learning methods, among them Socratic or inductive teaching; problem solving; seminars; individual research, and clinical experience.

Admission

To be admitted to the Law School, an applicant must be a college graduate who has excelled academically and has scored in the upper range of the nationally administered Law School Admission Test. In addition, applicants must meet the general university admission requirements, including the personal standards required of all students.

The Law School selects approximately 150 students each year for admission to the new class. Admissions are for fall semester only.

Application deadline: February 15.

By the posted deadline, all parts of the completed application must have been received by the Law School Admissions Office, 340 JRCB. To be considered complete, the application must include the following:

—A completed application on the official Law School application form.

—A check or money order for \$30 payable to Brigham Young University. (This is an application fee and is neither refundable nor credited toward tuition.)

—Three completed evaluations from undergraduate teachers on Prospective Law Student Evaluation Forms included in the official application.

—The report of the applicant's interview with an LDS bishop, branch president, or mission president; religious leader of another faith; or judge of a court of general

jurisdiction indicating the applicant's willingness to comply with the BYU Honor Code and standards of conduct.

For additional information about admissions requirements, criteria, notification, and procedures, including the LSAT and registration with the Law School Data Assembly Service (LSDAS), see the current Law School Bulletin.

Besides the juris doctor degree, the university has approved programs whereby qualified students can obtain a concurrent master's degree in business administration, public administration, accounting, or organizational behavior while pursuing a law degree. These are four-year programs.

LLM Program

The J. Reuben Clark Law School created the Master of Laws (LLM) Program in 1988 to provide an opportunity for lawyers trained in jurisdictions outside the United States to engage in a comparative study of the U.S. legal system with that of their home country. The program provides maximum exposure to the U.S. legal system and frequent interaction between master of laws students and students seeking the juris doctorate degree. Students obtain a solid foundation in the basic principles of United States law while being allowed the flexibility to pursue personal academic interests. To ensure a superior educational experience for students in the program, admission is limited to six to eight applicants per year.

Tuition, Fees, and Financial Aid

Tuition and fees must be paid before or at the time of registration. Since more than 50 percent of the cost of operating the Law School comes from the tithes of The Church of Jesus Christ of Latter-day Saints, students and the families of students who are tithe-paying members have already made a significant contribution to the university and are thus charged a lower tuition fee than nonmembers. This disparity is similar to the higher tuition charged by law schools of state universities to nonresidents.

Semester tuition: \$2,200 LDS
 \$3,300 non-LDS

A number of scholarships and endowed awards are available to law students, as well as a variety of low-interest loans. Students interested in these opportunities should inquire at the Law School and the university's Financial Aid Office.

Law Courses

505 and 506. Torts 1 and 2. (3 ea.)

A study of the judicial process in civil actions for damages or equitable relief for physical, appropriational, and defamatory harms to personality, property, and relational interests. Some consideration is given to alternative reparation systems such as workers' compensation and "no-fault" automobile insurance plans.

510 and 511. Contracts 1 and 2. (3 ea.)

An examination of the kinds of promises that are enforced at law, and the nature of the protection given. Inquiry will be made into the formation, performance, and discharge of contracts; their assignment, termination, and modification; and the variety, scope, and limitations on remedies. Attention will be given to Article Two of the Uniform Commercial Code.

515 and 516. Civil Procedure 1 and 2. (3 ea.)

A basic study of the operation of courts, including an introduction to the organization of state and federal courts and relationships between them. Among topics studied will be jurisdiction over persons, things, and subject matter; venue; the scope of litigation as to claims, defenses, and parties; pleading, pretrial motions, discovery, and pretrial conferences; trials and the functions of judges, juries, and lawyers; appeals and the role of appellate courts; and the enforcement and finality of judgments and decrees.

520 and 521. Property 1 and 2. (3 ea.)

An inquiry into the nature of "property" and "ownership" of land and structures on land, and the ways in which ownership may be established, restricted, transferred, and divided among various persons.

525. Criminal Law. (3)

A review of problems in defining what conduct should be subjected to criminal penalties; the limitations of criminal law as a means for prevention and control of undesirable conduct.

535 and 536. Legal Research and Writing 1 and 2. (1.5 ea.)

A study of the fundamentals of good legal research, proper legal citation form, basic principles of legal analysis, elements of good writing style, legal memorandum drafting, appellate brief writing, and appellate advocacy. Actual research and writing exercises are key components of the course.

541. Public Interest Law. (2)

A study of lawyers' responsibilities and opportunities to use their specialized training to assist members of the public who are not adequately represented, including an examination of various legal issues commonly encountered in pro bono and public interest work. The course will help students prepare themselves to meet these vital legal needs.

599R. Externship.

- Legal Services
- Externship
- Pro Bono*
- Cooperative Education

602. Administrative Law. (3)

An examination of the administrative process. The course examines why administrative agencies are created, how they obtain and use information, what proceedings (rulemaking/adjudication) they can commence, and what controls over agency action (political/judicial) exist. The role of the attorney in this process is emphasized.

603. Criminal Procedure. (3)

An analysis of problems in administering a system of criminal law; constitutional and policy limitations on public officers in dealing with suspected, charged, and convicted offenders.

604. Advanced Legal Writing. (2)

Students will study and apply the techniques of sound writing that are most challenging for lawyers. Extensive writing, editing, and classroom participation are required. Students will produce a substantial paper.

605. Antitrust. (3)

The course will examine the development of legal doctrine under the Sherman Act and supplemental legislation, including price fixing, division of market, monopolization, mergers, tying and exclusive dealing arrangements, boycotts, and special relationships between principles of patent and antitrust law. Parallel attention will be focused on the relationships between principles of law and economics, examined in the context of certain key cases and the evidence in those cases.

606. Anglo-American Legal History. (2)

This seminar will survey the legal systems and values introduced to the British Isles by successive invasions up to the 11th century. From the 11th century to modern times, a single area of legal developments will be considered to discern the impact of historical forces and societal values on the course of those developments, especially the divergence of English and American rules.

607. Biblical Law. (2)

A comparative study of selected legal topics in the law codes of the Sumerians, Babylonians, Hittites, Assyrians, and Israelites, as well as legal cases in the Book of Mormon and the New Testament.

610. Business Associations. (3)

An introduction to the law relating to business enterprises, including the partnership and the corporation. The elements of agency will be included. Corporate structure, control, management, ownership, and finance will be discussed, as will government regulation.

611. Advising Closely Held Business. (2)

Prerequisite: Law 641.

Advanced work in partnerships, corporations, and federal taxation in the context of business planning and counseling. Based on readings and problems that consider a broad range of matters commonly faced by lawyers who advise closely held businesses, including: drafting partnership agreements, determining whether and how to incorporate, organizing the closely held corporation and preparing basic corporate documents, counseling the owners of an ongoing corporate business, working with accountants and other professional business advisors, arranging business financing, getting earnings out of a corporate business, forming professional corporations, and avoiding common malpractice and ethical problems. Course grade will be determined from performance on a series of document-drafting exercises.

615. Secured Transactions. (3)

This course is concerned with all aspects of security in personal property. (Personal property includes everything except land.) Covered are problems and legal principles relevant to the creation of the security interest, to its perfection, to priorities between competing security interests and between a security interest and other kinds of property interest; to payment and redemption, and to realization procedures. The emphasis will be on Article 9 of the Uniform Commercial Code.

616. Commercial Paper. (3)

A study of negotiable instruments (checks, drafts, notes) under Articles 3 and 4 of the Uniform Commercial Code, letters of credit, and electronic transfers.

618. Community Property. (2)

A study of community property: the basic concept and underlying policies; initiation and existence of a marital community; property capable of community ownership; classification of property as community or separate; and property management and control.

619. Conflict of Laws. (3)

An examination of jurisdictional issues, choice of law, and recognition of judgments in cases involving interstate and state-federal conflicts.

620. Constitutional Law 1. (3)

A study of the constitutional structure of the federal republic, including problems of judicial review, justiciability, sources of limitations upon national and state power, interstate commerce, taxing and spending, intergovernmental relationships within the federal system, separation of powers, and procedural and substantive due process protection of individual rights.

621. Constitutional Law 2. (3)

A study of the relationship between government and the individual, focusing on equal protection and constitutional restraints on private conduct.

623. Bankruptcy. (3)

Prerequisite: Law 615 prior or concurrently; Law 610 and 650 recommended prior or concurrently.

An overview of consumer and business bankruptcies, reorganizations, bankruptcy procedure, and the bankruptcy court system.

625R. Evidence. (3 hours for M. Goldsmith's section, 4 hours for E. Kimball's section)

An examination of the law of evidence, including the principles governing the admissibility of evidence, the competency of witnesses, and the function of lawyer, judge, and jury in the presentation and evaluation of evidence.

628. Remedies. (3)

A study of the general principles and basic rules governing the rich inventory of remedies available through American courts. The principles associated with the law of remedies cut across substantive fields and guide the lawyer in fashioning or defending against various remedial schemes in any substantive context. The course emphasizes issues and developments of contemporary importance and includes public as well as private law remedies.

632. Family Law. (3)

An overview of state regulation of family relations, emphasizing marriage and divorce, adoption, child custody, regulating the ongoing family, and selected constitutional issues.

633. Children and the Law. (formerly Advanced Family Law) (2)

Prerequisite: Law 632.

A study of issues relating to state regulation of parent-child relations, including children's rights, parent rights, juvenile courts, adoption, health decisions, educational decisions, child abuse and neglect, youth status offenses, and delinquency.

640. Federal Taxation 1. (4)

A study of federal personal income tax, with an introduction to business and corporate income tax and federal tax procedure. Emphasis is placed on developing the student's ability to examine and understand statutory, judicial, and administrative tax law and to apply the law in solving specific problems.

641. Federal Taxation 2. (4)

Prerequisite: Law 640.

This course covers in detail the federal income tax consequences flowing from the creation, operation, merger, dissolution, and sale of partnerships and corporations and examines federal tax considerations bearing on the choice between conducting a business in partnership or corporate form.

642. Intellectual Property Law. (2)

The fundamental principles of patentability and infringement, including a brief discussion of employment and noncompetition agreements for protecting inventions. The class is not limited to students with scientific degrees or those intending to specialize in patent law, but it is a prerequisite to Advanced Patent Prosecution and Claim Drafting.

643. U.S. Taxation of International Income. (2)

Prerequisite: Law 640.

This course surveys the application of the federal income tax to foreign income of U.S. citizens and residents and to the U.S. source income of foreigners. It also introduces students to the purpose and operation of income tax treaties.

644. Insurance Law. (3)

The major topics for lawyers include types of insurance; presenting claim, interpreting the insurance contract; measures of recovery; rights to proceeds of insurance; potential defenses by the insurer, and rights and obligations of insurers and the insured.

645. American Indian Law. (3)

A study of the law of the federal government and the states respecting Native Americans and their land. The course will consider the relationship of European discoverers and Native Americans during the Colonial period; Native American treaties, executive orders, and agreements; changing United States policy respecting Native Americans; federal, state, and tribal jurisdictions, civil and criminal; tribal courts; Native American hunting and fishing rights, water rights, and civil rights.

650. Real Estate Finance. (3)

A review of real estate finance transactions, including mortgages, trust deeds, installment sales contracts, other mortgage substitutes, receiverships, transfer of real estate security interests, discharge, deeds in lieu of foreclosure, foreclosure, foreclosure sales, redemption, deficiency payments, priorities, mechanics liens, judgment liens, purchase money mortgages, and ground leases.

652. Legislation. (3)

A study of the process by which policy is translated into statutory law and how that law is applied and interpreted, with emphasis on the legislative process, separation of powers, and statutory interpretation.

655. Labor Law. (3)

This course examines how collective bargaining relationships are established and how collective bargaining agreements are negotiated and administered in the private sector. The course also explores the use of economic weapons, e.g., strikes, boycotts, and picketing.

656. Public Lands and Natural Resources. (3)

This course surveys the field of natural resources law in the context of federal public lands. Topics covered include public land, law, water, hard-rock minerals, oil and gas leasing, timber, grazing and range management, wildlife, recreation, and environmental law. The current political controversies surrounding energy development and land use restrictions give rise to special concerns with this topic throughout the western states.

660. Professional Responsibility. (2)

A study of the ethical and professional responsibilities of practicing lawyers. Primary focus is on the Model Rules of Professional Conduct.

661. Public Policy Negotiations. (3)

This seminar emphasizes the application of negotiation theories and skills to civil rights issues and public law conflicts. It is designed for those students pursuing careers in public interest law, poverty law, or a public policy-oriented practice (e.g., environmental, education, housing, health care).

662. Securities Regulation. (3)

Prerequisite: Law 610 recommended but not required.

A study of the Securities Act of 1933, the Securities Exchange Act of 1934, state blue sky laws and regulations, the distribution and trading of securities, express and implied civil liabilities, criminal liability, insider trading, tender offers, broker-dealer regulation, and liability of collateral participants and professional advisors.

663. State and Local Government 1. (3)

A study of the interrelationship among national, state, and local governments and the powers of each, as well as an examination of separation-of-powers principles and the impact of the political process at the state and local level.

666. Wills, Decedents' Estates, and Trusts. (4)

An examination of the legal framework of private and charitable trusts as vehicles for the donative disposition of personal wealth and a study of family wealth transmission problems, intestate succession, wills and will substitutes, and the probate process.

668. Legal Negotiation and Settlement. (3)

The theory and practice of negotiation. During the first four or five weeks, the emphasis is on learning (1) the functions of negotiation in the professional life of lawyers, (2) the negotiating skills and patterns of practicing lawyers (based upon empirical research and careful in-class analysis of videotapes of attorneys engaged in various negotiating situations), (3) the meaning and purposes of negotiations from the client's perspective, (4) some of the dynamics of negotiation as experienced during in-class group negotiating exercises, (5) why persons cannot be better negotiators than they are human beings, and (6) why development as a negotiator is a lifelong process. During the remainder of the semester, class members prepare and negotiate approximately eight cases and transactions, including small and large cases in litigation as well as non-conflict-based business and commercial transactions.

670. Advanced Real Estate Transactions. (2)

Prerequisite: Law 650.

The development and financing of subdivisions, condominiums, and income properties, as well as the impact of bankruptcy on real estate ownership and financing.

679. Alternative Dispute Resolution. (2)

Prerequisite: Law 668.

The theory and practice of dispute resolution, with a primary focus on mediation, arbitration, and the various "hybrids" such as mini-trial, summary jury trial, and innovative uses of third-party neutral experts. The class focuses on the information lawyers need for advising their clients about the pros and cons of these processes and the skills lawyers must have to competently participate in them.

680. State and Local Government 2. (3)

Prerequisite: Law 663 suggested but not required.

A study of trends and perspectives in state and local government, with emphasis on state and local control over, and federal limitation on, licensing, land use, and taxation, as well as state and local governmental liability under federal civil rights statutes.

681. Federal Estate and Gift Tax. (2)

Prerequisite: Law 666.

An examination of the federal estate and gift tax, including basic estate-planning concepts.

695R. Law School Seminar. (Arr.)

- Professional Seminar
- Hazardous Materials Law
- Real Estate Development
- Advanced Legal Research
- The Defense Function
- Legal Interviewing and Counseling
- Computer-based Practice Systems in Law
- In-Class Utah Legal Services Seminar
- In-Class Externship / Pro Bono Seminar
- Civil Trial Practice
- Constitutional Law 3
- International Institutions
- Lender Liability
- Business Associations
- Law and Religion
- Origins of the Constitution
- Poverty-based Immigration Law
- Tax-exempt Organizations and Charitable Giving
- Federal Courts 1 and 2
- Introduction to American Law
- Selected Issues in Employment Law
- Selected Issues in International Business Transactions

696R. Law School Seminar. (Arr.)

- Professional Seminar
- Collective Bargaining
- State Constitutional Law
- Business Reorganization Under the Bankruptcy Code
- Planning, Negotiating, and Drafting Commercial Transactions
- Legal Interviewing and Counseling
- Advanced Computer-based Practice Systems in Law
- In-Class Utah Legal Services Seminar
- In-Class Externship / Pro Bono Seminar
- Civil Trial Practice
- Advanced Estate Planning
- Products Liability
- Comparative Church and State
- Advanced Comparative Law
- Construction Law
- Advanced Patent Prosecution and Claim Drafting
- Federal Courts 1 and 2

699R. LLM Thesis. (Arr.)

Linguistics

Chair: Melvin J. Luthy, 2129 JKHB, 378-2937

Graduate Coordinator: John S. Robertson, 2113-B JKHB, 378-3263

Faculty/Specialties

Professors

Blair, Robert W. (1959) PhD, Indiana University, Bloomington, 1964. SLA, Sociolinguistics and Methodology, Materials Development.

Luthy, Melvin J. (1971) PhD, Indiana University, Bloomington, 1967. Phonology, Syntax, Finnish Studies.

Melby, Alan K. (1977) PhD, Brigham Young University, 1976. Computer Aids for Translators, Syntax, French.
 Robertson, John S. (1977) PhD, Harvard University, 1976. Mayan Linguistics, Semiotics, Semantics, Comparative Historical Linguistics.

Associate Professors

Brown, Cheryl (1975) PhD, University of California, Los Angeles, 1983. SLA, Discourse, Methodology, Research Design, TESL.
 Graham, Charles Ray (1980) PhD, University of Texas, Austin, 1977. SLA/Attrition, ESL, Spanish.
 Henrichsen, Lynn E. (1992) PhD, University of Hawaii, 1978. TESL, Methodology, Materials Development, EST.

Assistant Professors

Scott, Mary Lee (1990) PhD, University of California, Los Angeles, 1989. Applied Linguistics, Testing, Language Acquisition.
 Shelley, Monte F. (1976) PhD, Brigham Young University, 1983. Text Retrieval and Analysis, Instructional Science and Instructional Evaluation.

The following are linguists in language departments who frequently teach linguistics courses in their own disciplines or in the Department of Linguistics and who also serve on graduate and other committees for the Linguistics Department.

Belnap, R. Kirk (Asian Languages)

Bourgerie, Dana (Chinese)

Brown, Bruce L. (Linguistics and Psychology)

Bush, Charles (Computer Applications)

Clegg, J. Halvor (Spanish)

Eggington, William (English)

Fails, Willis C. (Spanish)

Hallen, Cynthia (English)

Hart, David K. (Russian)

Jarvis, Donald (Russian)

Jones, Randall L. (German)

Larson, Jerry (Spanish)

Lund, Randall (German)

Mathews, Thomas J. (Spanish)

Meredith, R. Alan (Spanish)

Oaks, Dallin D. (English)

Parkinson, Dilworth B. (Arabic)

Russell, Robert A. (Japanese and Arabic)

Skousen, Royal (English)

Smith, Kim (Computer Applications)

Turley, Jeffrey S. (Spanish)

Watabe, Masakazu (Japanese)

The Linguistics Department is responsible for the following academic programs:

Linguistics

Teaching English as a Second Language

Native American Languages

Austronesian Languages

Welsh

American Sign Language

Graduate Degrees and Programs

MA Linguistics

Certificate, MA TESL

Degree and Program Requirements

MA Linguistics

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
 Fall —February 28 (U.S. and international)
 Winter —June 30 (U.S. and international)
 Spring —October 31 (U.S. and international)
 Summer —December 31 (U.S. and international)
 Fall semester entry recommended.

- B. International applicants: Departmental English Proficiency Exam and TOEFL, minimum score 580.

II. Prerequisite:

- A. Linguistics 330.
- B. High-level competency (301 level or higher) in one foreign language, plus 12 university credit hours in a second foreign language (one of these foreign languages must be non-Indo-European) or 12 university credit hours in approved computer science courses.
- C. ESL 404 is required of all nonnative English speakers.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Ling 699R).
- II. Required courses: Ling 450, 500, 521, 535, 540, 550, 630, 690, 699R plus one 321-level foreign language class.
- III. Thesis.
- IV. Examinations (consult department for details):
 Oral defense of thesis.

Graduate Certificate TESL

BYU's TESL certificate (not to be confused with state teacher certification) is designed to prepare teachers for overseas English programs as well as for stateside English assignments teaching foreign students.

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
 Fall —February 28 (U.S. and international)
 Spring —October 31 (U.S. and international)
 Summer —December 31 (U.S. and international)
 Fall semester entry recommended.

- B. Entrance examinations for nonnative speakers of English: TOEFL, minimum score 580; Departmental English Proficiency Exam. Any deficiencies in English skills must be remedied to the satisfaction of the department before moving into the TESL program.

II. Prerequisite:

- A. Ling 230.

- B. ESL 404 is prerequisite for all nonnative English speakers. Both Ling 230 and ESL 404 should be completed before or during the first semester of course work.

Requirements for Certificate

- I. Credit hours: Minimum 18 course work hours.
- II. Required courses: Ling 577, 579.
- III. Electives: 12 hours from Ling 500, 525, 531, 540, 555, 565R, 572, 573, 641, 660, 677, 678.

The graduate TESL program has been accepted by the Utah Board of Education as an accredited teaching major for secondary education students. Those who have completed student teaching in an area other than ESL are still required to complete 2 hours of student teaching in English as Second Language (Ling 579).

MA TESL

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall semester entry recommended. Application made upon completion of TESL certificate.
 - B. Applicants must petition the department and be accepted by a review board. Students should not register for 600-level course work until notified of acceptance into the MA program.
- II. Prerequisite:
 - A. Completion of graduate TESL certificate.
 - B. Intermediate-level proficiency in a modern foreign language. (Language courses may be taken concurrently with ESL graduate courses.)
 - C. Ling 500 and acceptance of thesis prospectus.
 - D. Evidence of graduate-level writing skills.

Requirements for Degree

- I. Credit hours (37): Minimum 31 hours (including 18 hours from TESL certificate) plus 6 thesis hours (Ling 699R).
- II. Required courses: Ling 540, 600, 695.
- III. Electives: 6 hours chosen from Ling 420, 521, 525, 531, 535, 550, 551, 555, 565R, 572, 573, 600, 641, 671, 677, 678, 679, Engl 529.
- IV. Thesis.
- V. Final oral examination: defense of thesis and examination of course work.

Linguistics Graduate Courses

500. Bibliography and Research. (1)

Procedures for developing research projects and reporting on their results; priority given to major papers and MA thesis projects.

521. Phonology. (3)

Prerequisite: Ling 330.

Discriminative values of speech sounds: their function in the communicative process. Analysis of phonological data via postulation of underlying forms and derivational rules.

525. Phonology of Modern English. (3)

Articulatory phonetics (phonemics), intonation, and contrastive analysis of English sounds with those of other languages. Strong practicum included.

531. Grammar Usage. (3)

Examining English grammar and usage as they reflect different theories about language description and applying this knowledge in the ESL classroom.

535. Semantics. (3)

Prerequisite: Ling 330.

Theory and practice of semantic analysis with special emphasis on Jakobsonian and Peircian semiotics.

550. Sociolinguistics. (3)

Research and theory in anthropological linguistics and sociolinguistics.

551. Anthropological Linguistics. (3)

Language in culture and society: development, typology, and description.

555. Teaching Culture. (3)

Experience developing materials and activities dealing with typical patterns of U.S. lifestyle. Variety of readings.

565R. Humanities Computing Project. (1-3)

Prerequisite: instructor's consent.

Major application or research project, working with instructor to do ongoing research or program development.

572. TESL Reading-Writing. (3)

Basic techniques for teaching ESL skills in reading and writing; applying these skills in the classroom.

573. TESL Literature. (3) On dem.

Teaching literature to nonnative English speakers, both TEFL and TESL.

577. Introduction to ESL Methodology. (4)

Prerequisite: ESL 404 or being native English speaker.

Instruction in basic second language methodology, ESL teaching techniques, and materials selection. Actual ESL class observation and practice.

579. TESL Student Teaching. (2)

Prerequisite: Ling 577 and department's consent.

580R. Problems in Linguistics and Applied Linguistics. (1-3) On dem.

Advanced research in language acquisition, sociolinguistics, psycholinguistics, linguistics field study, applied linguistics.

590R. Readings in Linguistics. (1-3)

Prerequisite: instructor's consent.

Individual study of current linguistic literature. Occasional discussion sessions with instructor and other class members. Pass-fail grade only.

599R. Cooperative Education. (1-9) On dem.

On-the-job experience under faculty supervision.

600. Research Design and Bibliography. (3)

Prerequisite: Ling 500.

Analysis of the options in research design for examining language teaching and acquisition; basic statistics; use of computers in language research.

630. Syntactic Theory. (3)

Prerequisite: Ling 430 or equivalent.

Theory of transformational grammar, emphasizing its history and recent extensions.

641. Interlanguage Analysis. (3)

Prerequisite: Ling 330 or equivalent.

Language as it relates to language acquisition and teaching, including contrastive analysis, error analysis, and discourse analysis.

660. Language Testing. (3)

Construction, analysis, use, and interpretation of language tests.

677. Advanced Methodology. (3)

Prerequisite: Ling 577 or equivalent.

Advanced ESL methodology and its classroom application.

678. Materials Development. (3)

Prerequisite: Ling 577.

Computer-assisted language materials development; evaluating and adapting texts, exercises, games, and supplementary teaching aids; developing tapes.

679. TESL Supervision-Administration Internship. (3)

Prerequisite: Ling 671 or instructor's consent.

Actual fieldwork in TESL settings involving supervision, in-service training, and curricula-program study and administration.

690. Seminar in Linguistics. (2)

Prerequisite: Ling 630.

Advanced research and analysis of various linguistic problems.

695. TESL Seminar. (1)

Prerequisite: completion of majority of ESL courses; instructor's consent.

Integrating TESL theory and practice; refining thesis and publicly presenting and defending preliminary thesis.

699R. Master's Thesis. (1-9)**Management Communication**

Chair: Paul R. Timm, 590 TNRB, 378-5682

The Department of Management Communication does not offer a graduate degree. It offers the following graduate course plus other courses included in the MBA, MAcc, and MPA listings. Refer to the BYU Undergraduate Catalog for faculty listings.

642. Communication for Professional Accounting. (1.5)

Prerequisite: MCom 320.

Theory and application of written and oral communication for professional accounting.

Managerial Economics

Chair: Dwight M. Blood, 610-A TNRB, 378-2364

Graduate Coordinator: B. Michael Pritchett, 614 TNRB, 378-2364

Faculty/Specialties**Professors**

Barnes, Howard W. (1964) Dr. rer. pol., Technical University of Brunswick, FRG, 1968.

Marketing/International Business.

Blood, Dwight M. (1980) PhD, University of Michigan, 1963. Micro and Macro Theory, Macro Policy.

Bryson, Phillip J. (1983) PhD, Ohio State University, 1967. Comparative Economic Systems, Microeconomics.

Clarke, Darral G. (1985) PhD, Purdue University, 1972. Quantitative Methods; Economic Marketing Analysis, Strategic Planning, Decision Making.

McDonald, James B. (1972) PhD, Purdue University, 1970. Quantitative Methods, Econometrics.

Pritchett, B. Michael (1969) PhD, Purdue University, 1970. Quantitative Methods, Econometrics, Public Finance.

Associate Professors

Crawford, Robert G. (1972) PhD, Carnegie-Mellon University, 1975. Business Economics.

Koller, Roland H., II (1969) PhD, University of Wisconsin, Madison, 1969. Economics, Industrial Organization.

Nelson, Ray D. (1985) PhD, University of California, Berkeley, 1981. Speculative Markets, Applied Statistical Modeling, Decision Making Under Uncertainty.

Graduate Degree and Program

MS Managerial Economics

A graduate specialty in managerial economics has proven valuable to several types of students. Among these are (1) those seeking a distinct specialty as part of a professional degree, such as the MBA, MPA, or law degrees; (2) those seeking positions that require ability to apply economic analysis as well as an awareness of broad economic or management principles; and (3) those wishing to strengthen their training before entering (or applying for) a PhD or other graduate program.

Experience in placing graduates suggests that students are well served by having a strong quantitative foundation. This emphasis is often particularly valuable when developed with areas such as finance and marketing. Nevertheless, such an emphasis is often best developed in a context including the study of management, government, economics, operations, and public administration.

Members of the faculty are available to consult with students concerning their careers, degree alternatives, plans of study, and career development.

Of special interest to entering MBA students with an undergraduate degree in economics (or considerable undergraduate training in economics) is the concentration in managerial economics offered in the MBA Program. Interested students should see the department chair for further information.

Degree and Program Requirements

MS Managerial Economics

This degree emphasizes training in applied economic analysis and specialties. Typical students become especially knowledgeable in model formulation and estimation. They learn forecasting methods and other analytical techniques used in managerial decision making. Graduates are trained in empirical and analytical techniques related to firms, industries, and the national and international economic environment.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—May 15 (U.S.)
Winter	—June 30 (international)
	—September 15 (U.S.)
Spring	—October 31 (international)
	—February 20 (U.S.)
Summer	—December 31 (international)
	—April 15 (U.S.)
 - B. Entrance examination: GMAT, GRE General Test, or equivalent
 - C. TOEFL or Michigan Test in English required of international students who do not speak English as their first language.
- II. Prerequisite: Intermediate microeconomic and macroeconomic theory, principles of statistics (3 hours), and introductory calculus (3 hours).

Requirements for Degree

- I. Credit hours:
 - A. Thesis option (30): Minimum 24 course work hours plus 6 thesis hours (ManEc 699R).
 - B. Project option (33): Minimum 33 course work hours plus major research project.
- II. Consult department for full program description and additional course requirements.
- III. Examination: Oral defense of thesis or project.

Managerial Economics Graduate Courses

552. Urban Analysis. (3)

Prerequisite: ManEc 300, 301, or equivalent.

Applying economic theory to urban problems and policies.

576. Topics in Government and Business. (3)

Prerequisite: ManEc 300, 301, or instructor's consent.

Analyses of either antitrust or public regulation of business (varies with semester).

589R. Mathematical Theory of Managerial Economics. (3)

Prerequisite: ManEc 300, 301, 486, or instructor's consent.

Mathematics of optimization as applied to economic decisions.

594R. Seminars in Selected Managerial Economics Topics. (1–6)

Prerequisite: instructor's consent.

Seminars covering a variety of topics in economic policy and theory.

595R. Lectures in Managerial Economics. (1–3)

Prerequisite: instructor's consent.

596R. Readings in Managerial Economics. (1–3)

Prerequisite: instructor's consent.

597R. Research in Managerial Economics. (1–3)

Prerequisite: instructor's consent.

610. (ManEc-MBA) Consulting Applications of Economic Analysis. (3)

The application of economics, including dynamic modeling, to the problems of managing business transactions.

611. (ManEc-MBA) National and International Business Environment. (3)

Macroeconomy presented at an intermediate level with special attention to government and international trade sectors.

613. (ManEc-MBA) Business and Economic Forecasting. (3)

Application of forecasting methodologies with an emphasis on time series analysis.

614. (ManEc-MBA) Market Analysis and Decision Making. (3)

Use of marketing research, economic theory, and statistics in managerial decision making. Understanding manager's role in working with technical specialists to improve business planning.

615R. (ManEc-MBA) Seminar in Managerial Economics. (3)

Preparing and presenting economic analysis to line managers.

688. (ManEc-MBA) Applied Econometrics. (3)

Prerequisite: ManEc 300, 301, calculus or equivalent, and a first course in econometrics.

Econometric techniques and applications.

689. Advanced Econometric Techniques. (3)

Prerequisite: ManEc 688 or Econ 388.

Econometric techniques such as time series analysis, nonlinear estimation techniques, and simultaneous equation models.

699R. Master's Thesis. (3–6)

Manufacturing Engineering and Engineering Technology

Chair: A. Brent Strong, 435 CTB, 378-7878

Graduate Coordinator: W. Edward Red, 435R CTB, 378-5539

Faculty/Specialties

Professors

Adams, Brent L. (1992) PhD, Ohio State University, 1979.
Metal Microstructure.

- Allen, Dell K. (1960) EdD, Utah State University, 1973.
Computer-integrated Manufacturing, Group
Technology.
- Strong, A. Brent (1986) PhD, University of Utah, 1971.
Composites, Plasma Surface Treatments, Plastics.
- Associate Professors**
- Hawks, Val D. (1985) MIE, Lehigh University, 1986. CIM
Database Management Systems.
- Johnson, Kent W. (1991) PhD, Stevens Institute of
Technology, 1965. Electronic Filters.
- Kunzler, John J., Jr. (1971) MS, Brigham Young
University, 1980. Computer-integrated
Manufacturing, Manufacturing Systems.
- Red, W. Edward (1983) PhD, Arizona State University,
1972. Robotics, Automation, Applied Mechanics.
- Rotz, Christopher A. (1985) PhD, Massachusetts Institute
of Technology, 1978. Polymer Properties and
Processing Composites.
- Smart, Merrill J. (1967) MS, University of Utah, 1962.
Real-Time Computer Systems.
- Sorensen, Carl D. (1987) PhD, Massachusetts Institute of
Technology, 1985. Design for Manufacture,
Manufacturing Processes.
- Todd, Robert H. (1989) PhD, Stanford University, 1971.
Manufacturing Processes, Process Machine
Development, Manufacturing Systems, Engineering
Design.

Assistant Professors

- Carter, Perry W., II (1980) MS, Brigham Young University,
1974. Automatic Assembly.
- Harrell, Charles R. (1982) PhD, University of Denmark,
1988. Simulation.
- Helps, C. Richard G. (1986) MSEE, Witwatersrand
University, Johannesburg, South Africa, 1986.
Real-Time, Process Control, Automation Systems.
- Kohkonen, Kent E. (1970) MS, Brigham Young
University, 1976. CNC Software Development,
Processing Languages, Parametric Programming,
Tool Database Development, Plastic.
- Mather, C. Glayd (1974) MS, Utah State University, 1965.
Information Transmission, Light Frequency Systems.
- Owen, Earl F. (1982) MS, University of Utah, 1972. RF
Microwave Circuits.

Graduate Degrees and Programs

- MS Computer-integrated Manufacturing
MS Manufacturing Engineering
MEM Engineering Management
MTM Technology Management

Degree and Program Requirements

MS Computer-integrated Manufacturing

Admission and Entry

- I. Application requirements:

- A. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—May 15 (U.S.)
Winter	—June 30 (international)
	—September 15 (U.S.)
Spring	—October 31 (international)
	—February 20 (U.S.)
Summer	—December 31 (international)
	—April 15 (U.S.)

B. Entrance examinations:

1. GRE General Test.
2. TOEFL score of 570 for all international
applicants whose native language is not
English.

C. GPA: Must be 3.0 or higher.

- D. Consult graduate coordinator for additional
information.

II. Prerequisite:

- A. Baccalaureate degree in engineering, engineering
technology, or a related field with departmental
approval.
- B. Basic sciences background, along with engineering,
mathematics, and modern manufacturing
methods.
- C. All prerequisites must be completed before entrance
into the program. Students must make up any deficiencies after consultation with a
graduate faculty member and approval from
the department.

Requirements for Degree

- I. Credit hours (34): Minimum 25 course work hours
plus 9 thesis hours (MFET 699R).
- II. Required courses:
 - A. Core classes: MFET 529, 533, 534, 572.
 - B. Graduate Seminar: MFET 591R (0.5 each semester,
1 hour total).
- III. Electives: Minimum 12 hours from approved
courses. The electives must include one mathematics
course above integral calculus or one approved
statistics course (unless satisfied before entering
program). A study list of proposed courses is
required.
- IV. Thesis: Minimum 9 thesis hours. A prospectus on
the thesis is required.
- V. Examination: Oral defense of thesis.

MS Computer-integrated Manufacturing (Industrial)

An accelerated program is available to certain industrial employees who are graduates in engineering, engineering technology, or related fields. The program allows candidates to earn a master's degree in five spring terms of five weeks each and requires a project (MFET 698R, 3 credits). Consult the graduate coordinator for more information. Credit hours (34): Minimum 31 course work hours plus 3 project hours.

MS Manufacturing Engineering

The MS degree is awarded to students who have mastered professional education in selected areas of manufacturing engineering. Such education is gained through graduate course work that, unlike bachelor's course

work, consists largely of elective courses. Students gain the added experience of participation in research work at the cutting edge of the profession. This research work culminates in a high-quality presentation (the thesis). The MS degree normally requires a minimum of one year beyond the bachelor's degree.

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
 - Fall —February 28 (international)
—May 15 (U.S.)
 - Winter —June 30 (international)
—September 15 (U.S.)
 - Spring —October 31 (international)
—February 20 (U.S.)
 - Summer —December 31 (international)
—April 15 (U.S.)
- B. Entrance examination:
 - 1. A passing grade in the Fundamentals of Engineering (FE, formerly EIT) examination is required. (The exam is offered by the state of Utah in April and October.) If the student has not completed this examination before entering the program, a provisional acceptance, pending passing of the examination will be allowed. Alternately, with approval, a student may take the engineering subject test in the GRE examination.
 - 2. TOEFL score of 570 for all international applicants whose native language is not English.
- C. GPA: Must be 3.0 or higher.
- D. Baccalaureate degree (or equivalent) in manufacturing engineering from a school accredited by the ABET.
- E. Applicants with BS degrees in other engineering fields, engineering technology, chemistry, physics, material science, or metallurgy can only be admitted provisionally.

- II. Prerequisites: Determined in consultation with a graduate faculty member and approval from the department; may be completed on a provisional entrance into the program. (This should be done before registering for any courses in the program.)

Requirements for Degree

- I. Credit hours (34): Minimum 25 course work hours including 1 hour of Graduate Seminar (MFET 591R) plus 9 thesis hours (MFET 699R).
- II. Students must submit to their advisors a proposed study list and a written justification for the courses to be studied, which must then be approved by the graduate coordinator.
- III. Prospectus: Students must submit to their advisors a written prospectus on a proposed thesis topic, which must then be approved by the graduate coordinator.
- IV. Thesis: 9 credit hours. An article suitable for publication should result from the thesis.
- V. Oral defense of thesis.

MEM Engineering Management

MTM Master of Technology Management

See page 109 of this catalog for a description of the interdisciplinary program in engineering management. MEM and MTM students who wish to take classes in the Manufacturing Engineering and Engineering Technology Department should consult the department graduate coordinator.

Manufacturing Engineering and Engineering Technology Graduate Courses

Note: Most graduate-level courses in this department are offered once per year.

501. Fundamentals of Manufacturing Processes, Design, Materials, and Information Transfer. (3)

Overview of how things are made, with focus on the interrelation of manufacturing processes, design, materials, and information transfer. Importance of manufacturing in society.

528. Electronic Fabrication and Assembly. (3)

Prerequisite: EET 314 or equivalent and instructor's consent. Theory and application of manufacturing processes required to produce electronic equipment.

529. Manufacturing Information Processing and Networks. (3)

Prerequisite: Phses 221, EET 443, or instructor's consent. Function and system analysis and application for sensing, sending, and processing manufacturing information; metallic and lightwave technology networking; data, media, standards, topologies, protocols, instrumentation, and integration.

531. Advanced Computer Numerical Control Programming. (3)

Prerequisite: MET 230, CS 142, or instructor's consent. Programming techniques and requirements for manufacturing components on computer numerical control machining centers, emphasizing programming, applications, and software development.

532. Group Technology. (3)

Prerequisite: MET 332 or instructor's consent.

Classification theory and practice applied to workpiece classification and coding, statistics, cellular production, design retrieval, and implementation strategies, emphasizing computer application.

533. Computer-integrated Manufacturing. (3)

Prerequisite: MFE 480, 362, or instructor's consent

Basic activities, elements, and principles of computer-aided manufacturing, including terminology, systems integration, architecture, database development, interfaces, and computer hardware and software requirements with justification and implementation plans.

534. Automation. (3)

Determining appropriate levels of manufacturing automation based on economics and productivity. Elements of automation, including sensors, robots, conveyors, and part feeders.

536R. Advanced Process Mechanics. (3)

Prerequisite: MFE 432.

Analysis and experimental validation of selected manufacturing processes.

537. Advanced Mechanisms. (3)

Prerequisite: MeEn 337.

Kinematics and dynamics of advanced mechanisms, such as robots, with computer simulation of their motion. Task planning and simulation of mechanism activities in manufacturing work cells.

538. Technical Management. (3)

Techniques and tools for effective technical management. Management, analysis, cost justification, and communication skills within manufacturing or engineering environments.

540. Computer-aided Testing. (3)

Prerequisite: instructor's consent.

Introduction to computer-aided testing for product quality assurance using microcomputers, IEEE bus instrumentation, and host minicomputer systems.

541. Advanced Materials Science. (3)

Prerequisite: MET 335 or MFE 250; CEEn 203.

Builds on student's manufacturing and materials background to investigate interrelationship of material and process.

547. Information Transmission. (3)

Prerequisite: Phscs 221, EET 443, or instructor's consent.

Function and system analysis and applications for sensing, sending, and processing information.

553. (MFET-MeEn) Mechanical Behavior of Polymers. (3)

Prerequisite: CEEn 203, MFE 355, or instructor's consent.

Generalized elasticity relationships, viscoelasticity, yielding and fracture, crazing, rubber elasticity, anisotropic behavior, processing effects on properties, optical and other properties.

555. Introduction to Composites. (3)

Prerequisite: instructor's consent.

Structure, processing, properties, and uses of composite materials, including various manufacturing methods and the relationship between properties and fabrication.

572. Design for Manufacturing. (3)

Prerequisite: senior standing.

Introduction to design evaluation tools for use by product teams, including Quality Function Development, Early Cost Estimating, and Design for Assembly.

574. Tool Engineering. (3)

Prerequisite: MFE 434, senior standing.

Design of production machines and tools with functionality, producibility, maintainability, and cost considerations utilizing concurrent product and process design approach.

580. Manufacturing Simulation. (3)

Prerequisite: MFE 362 and instructor's consent.

Design and optimization of manufacturing systems using simulation. Simulation languages and modeling methodology.

591R. Graduate Seminar. (0.5)

Prerequisite: graduate standing.

Topics in research and thesis writing. Graduate students will present thesis and dissertation subject.

592R. Materials Seminar. (0.5)

Advanced topics in materials science and engineering.

595R. Special Topics. (Arr.)

Prerequisite: instructor's and department's consent.

655. Polymer Processing. (3)

Prerequisite: MeEn 312, MFE 355, or instructor's consent.

Rheology and transport phenomena involving polymeric fluids, including an analysis of extrusion, calendering, die forming, mixing, compression and injection molding, molding of reacting polymers, filament winding, and pulsation.

656. Microstructure and Properties of Metal Alloys. (3)

Treatment of models relating representations of microstructure to mechanical and physical properties of polycrystalline materials. Special emphasis on applications to optimal processing.

698R. Master's Project in Computer-integrated Manufacturing. (1-3)

Prerequisite: department's consent.

699R. Master's Thesis. (1-9)

Prerequisite: department's consent.

Mathematics

Chair: Peter W. Bates, 290 TMCB, 378-4156

Associate Chair and Graduate Coordinator: Gerald M. Armstrong, 288 TMCB, 378-7407

Assistant Chair: Jacqueline Taylor-Ortega, 286 TMCB, 378-3640

Faculty/Specialties

Professors

Baker, Roger C. (1991) PhD, University of London, 1971. Number Theory.

Barrett, Wayne Walton (1981) PhD, New York University, 1975. Matrix Theory and Applied Mathematics.

Bates, Peter W. (1984) PhD, University of Utah, 1976. Partial Differential Equations.

Cannon, James W. (1986) PhD, University of Utah, 1969. Geometric Topology.

Chatterley, Louis J. (1962) PhD, University of Texas, Austin, 1972. Mathematics Education.

Crawley, Peter L. (1971) PhD, California Institute of Technology, 1961. Infinite Groups.

Fearnley, Lawrence (1957) PhD, University of London, 1970. Topology.

Forcade, Rodney W. (1981) PhD, University of Washington, 1971. Combinatorics.

Garner, Lynn E. (1963) PhD, University of Oregon, 1968. Geometry, Commutative Algebra, Number Theory.

Gill, Gurcharan S. (1960) PhD, University of Utah, 1965. Functional Analysis.

Hansen, Richard A. (1967) PhD, University of Utah, 1965. Numerical Analysis.

- Jamison, Ronald D. (1963) PhD, University of Utah, 1965. Ordinary Differential Equations, Applied Mathematics.
- Lamoreaux, Jack W. (1968) PhD, University of Utah, 1967. Topology.
- Lang, William E. (1989) PhD, Harvard University, 1978. Algebraic Geometry.
- Moore, Hal G (1961) PhD, University of California, Santa Barbara, 1967. Ring Theory.
- Peterson, John Milo (1965) PhD, University of Georgia, 1965. Mathematics Education.
- Pollington, Andrew D. (1982) PhD, University of London, 1978. Number Theory.
- Robinson, Donald W. (1956) PhD, Case Institute of Technology, 1956. Linear Algebra.
- Smith, William V. (1985) PhD, University of Utah, 1978. Spectral Theory.
- Snow, Donald Ray (1969) PhD, Stanford University, 1965. Calculation of Variations, Functional Equations.
- Speiser, Robert David (1984) PhD, Cornell University, 1970. Algebraic Geometry and Commutative Algebra.
- Wight, Theodore A. (1963) EdD, University of Utah, 1969. Mathematics Education.
- Wright, David G. (1983) PhD, University of Wisconsin, Madison, 1973. Geometric Topology.
- Associate Professors**
- Armstrong, Gerald M. (1970) PhD, University of Wisconsin, Madison, 1971. Real Analysis.
- Chahal, Jasbir S. (1981) PhD, Johns Hopkins University, 1979. Algebraic Number Theory.
- Garbe, Douglas G. (1963) PhD, University of Texas, Austin, 1973. Mathematics Education.
- Humphries, Stephen B. (1987) PhD, University of Wales, 1983. Low-dimensional Topology, Classical Groups.
- Skarda, R. Vencil (1965) PhD, California Institute of Technology, 1965. Functional Analysis.
- Tolman, L. Kirk (1965) PhD, University of New Mexico, 1972. Graph Theory.
- Walter, Charles N. (1969) PhD, University of New Mexico, 1970. Algebraic Geometry and Ordered Fields.
- Wynn, Jan Eugene (1966) PhD, Colorado State University, 1972. Padé Approximations.
- Assistant Professors**
- Clark, David A. (1993) PhD, McGill University, 1992. Number Theory.
- Conner, Gregory R. (1992) PhD, University of Utah, 1992. Geometric Group Theory.
- Grant, Christopher P. (1993) PhD, University of Utah, 1991. Partial Differential Equations.
- Lawlor, Gary (1991) PhD, Stanford University, 1988. Minimal Surfaces.
- Lu, Kening (1990) PhD, Michigan State University, 1988. Applied Mathematics, Nonlinear Partial Differential Equations.
- Lundquist, Michael (1990) PhD, Clemson University, 1990. Matrix Theory.
- Ouyang, Tiancheng (1992), PhD, University of Minnesota, 1989. Partial Differential Equations.
- Williams, Steven R. (1993), PhD, University of Wisconsin, Madison, 1989. Mathematics Education.

Graduate Degrees and Programs

MS, MA, PhD Mathematics
MA Mathematics Education

Degree and Program Requirements**MS Mathematics**

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —March 1 (U.S. and international)
Winter —March 1 (U.S. and international)
Spring —March 1 (U.S. and international)
Summer —March 1 (U.S. and international)

- B. Entrance examinations: GRE General Test and subject test in mathematics. Every international applicant whose native language is not English is required to submit TOEFL scores.

II. Prerequisite:

- A. Credit at least equivalent to BYU requirements for a baccalaureate degree in mathematics.
- B. A year's sequence in abstract algebra.
- C. A year's sequence in advanced calculus.

Information for Degree—Thesis and Nonthesis Programs

- I. Graduate mathematics courses: Approved graduate mathematics courses include all classes numbered 500 and above with the exceptions of 501 and 502.
- II. Faculty sponsor: The graduate coordinator will assign each student a faculty sponsor on admission to the graduate program. Students should communicate with the sponsor as soon as they arrive on campus.

Requirements for Degree—Thesis Program

- I. Credit hours (30): Minimum 24 course work hours in approved graduate mathematics including 12 hours in courses numbered 600 or above and 6 thesis hours (Math 699R).
- II. Thesis.
- III. Oral defense of thesis.

Requirements for Degree—Nonthesis Program

- I. Credit hours:
 - A. Traditional mathematics option: Minimum 30 course work hours in approved graduate mathematics including 18 hours in courses numbered 600 or above.
 - B. Minor option (33): Minimum 24 course work hours in approved graduate mathematics including 6 hours in courses numbered 600 or above and 9 hours in an approved minor.
 - C. Applied option (36): Minimum 24 course work hours in approved graduate mathematics including 6 hours in courses numbered 600 or above and 12 hours in areas related to applications of mathematics. The 12 hours of application must be approved by the graduate coordinator.

- II. Paper and presentation: Write a paper on an area of advanced mathematics and give a 45-minute presentation based on the paper.
- III. Examination: Pass a written master's examination. Normally the examination must be taken no later than the end of the first year of graduate work. This requirement may also be filled by a sufficiently high score on the PhD written examination.

MA Mathematics

This program is designed to prepare students for teaching mathematics in junior college or secondary schools.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—March 1 (U.S. and international)
Winter	—March 1 (U.S. and international)
Spring	—March 1 (U.S. and international)
Summer	—March 1 (U.S. and international)
 - B. GRE recommended; required for international applicants.
- II. Prerequisite: Credit at least equivalent to current BYU requirements for a BA degree in education with a teaching major in mathematics, a BA degree in mathematics, or a BS degree in mathematics.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Math 699R).
- II. State teacher certification (required certification courses may not be part of the graduate program).
- III. Required courses: Math 315, 541, 629; any two-semester 600 sequence or Math 551, 552.
- IV. Minor (optional): Any approved minor.
- V. Thesis.
- VI. Examination: Oral defense of thesis.

MA Mathematics Education

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—March 1 (U.S. and international)
Winter	—March 1 (U.S. and international)
Spring	—March 1 (U.S. and international)
Summer	—March 1 (U.S. and international)
 - B. Entrance examination: GRE recommended; required for international applicants.
- II. Prerequisite: In-service status as a secondary teacher of mathematics.

Requirements for Degree

- I. Credit hours: Minimum 36 course work hours (at least 24 hours in mathematics, up to 12 hours in education). At least 20 hours must be in the 500 series or above.
- II. Required courses: Math 629.
- III. No thesis required.

PhD Mathematics

Admission and Entry

- I. Application requirements:

- A. Semesters of entry and application deadlines:

Fall	—March 1 (U.S. and international)
Winter	—March 1 (U.S. and international)
Spring	—March 1 (U.S. and international)
Summer	—March 1 (U.S. and international)

- B. Entrance examinations: GRE General Test and GRE subject test in mathematics. Every international applicant whose native language is not English is required to take the Test of English as a Foreign Language (TOEFL).

II. Prerequisite:

- A. Undergraduate degree in mathematics or its equivalent.
- B. One year of mathematical analysis (or advanced calculus).
- C. One year of abstract algebra, including linear algebra.

Requirements for Degree

- I. Credit hours (54): Minimum 36 course work hours in mathematics courses numbered 600 or above with a grade of B or better in each, plus 18 dissertation hours (Math 799R).
- II. Required courses: Complete at least 3 hours each in algebra, analysis, applied mathematics, and geometry/topology.

III. Examinations:

- A. Written examinations: At the beginning of the second year, the student is required to pass examinations in three of the four areas of algebra, analysis, applied mathematics, and geometry/topology. Four hours are allotted to each examination. A failed examination may be repeated once at the beginning of the winter semester of the student's second year, after which permission must be obtained from the department graduate committee to retake the examination. Passed examinations need not be repeated. Syllabi are available for each examination.

- B. Oral examination: A student must pass an oral qualifying examination covering the background necessary for research in a specific area. The student, having chosen a research area and having a dissertation advisor approved, will, with the advisor, outline suitable examination topics. These topics must be approved by an examination committee of three (including advisor) appointed by the department graduate committee, which conducts the examination.

- C. Defense of dissertation: A final oral defense of the dissertation is conducted by a faculty committee consisting of the student's research advisor, two other readers of the dissertation (one of whom may be an outside examiner), and two other members of the faculty.

- IV. Language requirement: Demonstrate proficiency in two approved foreign languages that are currently in major use in the mathematical literature. At present the approved languages are French, German, Russian, and Italian. Another language in certain cases may be substituted for one of these if the department graduate committee approves. The committee will consider the current usage of the language in the student's specialty area. The examinations are offered by the Mathematics Department twice a year. They are designed to test a student's ability to translate, with the aid of a dictionary, mathematical literature into scientifically correct English.
- V. Dissertation.

Mathematics Graduate Courses

501. Real Numbers. (3) F On dem.

Prerequisite: Math 371.

Extensive examination of various axiomatic descriptions of the real numbers and interrelationships among these descriptions.

502. Set Theory. (3) W On dem.

Prerequisite: Math 371.

Zermelo-Fraenkel axioms for set theory, the axiom of choice, ordinal and cardinal numbers, and algebra of sets.

511. Numerical Methods for Partial Differential Equations. (3) F

Prerequisite: Math 311, 343; 313 or 434. Recommended: Math 323.

Methods of characteristics, classification of equations, finite difference methods for partial differential equations.

512. Numerical Analysis. (3) Sp

Prerequisite: Math 411.

Theory of constructive methods in mathematical analysis.

513R. Advanced Topics in Applied Mathematics. (3)

On dem.

Prerequisite: instructor's consent.

521, 522. Methods of Applied Mathematics. (3 ea.) F, W

Prerequisite: Math 343, 434.

Survey of current methods, continuous and discrete, including linear algebra, estimation, differential equations of equilibrium, eigenvalue and initial value problems; finite element, spectral, transform and difference methods; Fourier series, the Fourier matrix, fast Fourier transform; convolution.

529R. Topics in Mathematics Education. (3)

Prerequisite: instructor's consent.

Current research and curriculum in mathematics education nationally and internationally; research techniques and interpretation.

530. Calculus of Variations. (3) On dem.

Prerequisite: Math 343, 434. Recommended: Math 323, 541.

Euler-Lagrange equation, sufficient conditions, Hamilton's principle of least action, Dirichlet's principle; applications to mechanics, geometry, economics, eigenvalue problems, direct methods.

532. Complex Analysis. (3) On dem.

Prerequisite: Math 332 or instructor's consent.

Theory of complex analysis at the beginning graduate level. Topics: Cauchy integral equations, Riemann surfaces, Picard's theorem, etc.

541, 542. Real Analysis. (3 ea.) F, W

Prerequisite: Math 315, 343, 344 for 541; Math 541 for 542.

Rigorous treatment of differentiation and integration theory, Lebesgue measure, Banach spaces.

543. Advanced Probability. (3) On dem.

Prerequisite: multivariable calculus. Recommended: Stat 341 or 520.

Combinatorial methods, random walk, Markov chains, stochastic processes.

547. Partial Differential Equations. (3) W

Prerequisite: Math 344, 434.

Topics from elliptic equations, heat equations; wave equations, stability, Fourier methods, energy methods, existence of solutions, etc.

551, 552. Introduction to Topology. (3 ea.) F, W

Prerequisite: completion of Math 315 for 551; Math 551 for 552.

Axiomatic treatment of linearly ordered spaces, metric spaces, arcs, and Jordan curves; types of connectedness.

585. Matrix Analysis. (3) On dem.

Prerequisite: Math 343.

Special classes of matrices, canonical forms, matrix and vector norms, localization of eigenvalues, matrix functions, applications.

629. Teaching Mathematics in Secondary Schools. (3) On dem.

631, 632. Complex Analysis. (3 ea.) On dem.

Prerequisite: Math 332, 542 for 631; Math 631 for 632.

634, 635. Theory of Ordinary Differential Equations. (3 ea.) F, W

Prerequisite: Math 434.

641, 642. Functions of Real and Complex Variables. (3 ea.) F, W

Prerequisite: Math 542 or instructor's consent for 641; Math 641 for 642.

643R. Special Topics in Analysis. (3) On dem.

Prerequisite: Math 642.

Continued fractions, stochastic processes, generalized functions, etc.

644. Harmonic Analysis. (3)

Math 532, 542.

Harmonic analysis on the torus and in Euclidean space. Pointwise and norm convergence of Fourier series and functional-analytic aspects of Fourier transforms are emphasized.

647, 648. Theory of Partial Differential Equations. (3 ea.) On dem.

Prerequisite: Math 323, 542 for 647; Math 647 for 648.

651, 652. General Topology 1, 2. (3 ea.) On dem.

Prerequisite: Math 552.

653R. Special Topics in Geometry. (3) On dem.

Prerequisite: Math 672.

Topics from n-dimensional projective and algebraic geometry, foundations, transformations, curves and surfaces, forms and sheaf theory.

655. Algebraic Topology 1. (3)

Prerequisite: instructor's consent.

656. Algebraic Topology 2. (3)

Prerequisite: Math 655.

661, 662. Functional Analysis. (3 ea.) On dem.

Prerequisite: Math 641 for 661; Math 661 for 662.

671, 672. Algebra. (3 ea.) F, W

Prerequisite: Math 372 for 671; Math 671 for 672.

673. Theory of Associative Rings. (3) On dem.

Prerequisite: Math 671, 672.

Noncommutative rings: modules, structure theory, radicals, commutative theorems, principle ideal ring, embeddings and localization, dimension theories.

675R. Special Topics in Algebra. (3) On dem.

Prerequisite: Math 672.

676. Commutative Algebra. (3) On dem.

Prerequisite: Math 671, 672.

Commutative rings, modules, tensor products, localization, primary decomposition, Noetherian and Artinian rings, application to algebraic geometry and algebraic number theory.

677. Homological Algebra. (3) On dem.

Prerequisite: Math 671, 672.

Chain complexes, derived functors, cohomology of groups, ext and tor, spectral sequences, etc. Application to algebraic geometry and algebraic number theory.

687R. Topics in Analytic Number Theory. (3) On dem.

Prerequisite: Math 387, 372, and instructor's consent.

Current topics of research interest.

688R. Topics in Algebraic Number Theory. (3) On dem.

Prerequisite: Math 372, 387, and instructor's consent.

Current topics of research interest.

695R. Readings in Mathematics. (1-2)**699R. Master's Thesis.** (1-9)**751R. Advanced Special Topics in Topology.** (3) On dem.

Prerequisite: instructor's consent and Math 651, 652.

Current topics in topology of research interest.

780R. Seminar in Algebraic Geometry. (3)

Topics selected from current research literature.

799R. Doctoral Dissertation. (Arr.)**Mechanical Engineering**

Chair: Geoffrey J. Germane, 242-C CB, 378-2625

Graduate Coordinator: Alan R. Parkinson, 242-M CB, 378-6544

Faculty/Specialties**Professors**

Cannon, John N. (1957) PhD, Stanford University, 1965.

Fluids, Combustion, Thermodynamics.

Chase, Kenneth W. (1968) PhD, University of California, Berkeley, 1972. Computer-aided Design for Manufacturing.

Free, Joseph C. (1961) PhD, Massachusetts Institute of Technology, 1967. Dynamic Systems, Modeling, Automatic Controls, Design Methods for Complex Systems.

Germane, Geoffrey J. (1979) PhD, Brigham Young University, 1978. Combustion System Design, Internal Combustion Engines, Automotive Engineering, Thermodynamics.

Heaton, Howard S. (1963) PhD, Stanford University, 1963. Heat Transfer and Fluid Mechanics.

Mortensen, Kay S. (1968) PhD, University of Utah, 1967. Materials, Expert Systems, Design Methods.

Raisor, E. Max (1968) MS, Brigham Young University, 1975. Interactive Computer Graphics.

Ulrich, Richard D. (1968) PhD, Purdue University, 1959. Fluids, Thermodynamics.

Wilkes, Doran F. (1958) EdD, University of Missouri, Columbia, 1966. Basic Engineering Graphics, Descriptive Geometry, Computer-aided Design.

Associate Professors

Eastman, Paul F. (1985) PhD, University of Utah, 1965. Ceramics, Polymer and Composite Materials, Aerodynamics.

Parkinson, Alan R. (1982) PhD, University of Illinois, 1982. Optimization and Computer-aided Engineering.

Queiroz, Mardson (1987) PhD, Carnegie-Mellon University, 1987. Combustion.

Red, W. Edward (1983) PhD, Arizona State University, 1972. Robotics, Automation, Applied Mechanics.

Simmons, Val E. (1969) PhD, Utah State University, 1970. Mechanism and Machine Design.

Smith, Craig C. (1980) PhD, Massachusetts Institute of Technology, 1978. Dynamic Systems and Controls, Automation, Auto Safety.

Tolman, Wilford J. (1960) MS, Brigham Young University, 1964. Computer-assisted Part Programming, Computer Graphics.

Webb, Brent W. (1986) PhD, Purdue University, 1986. Heat Transfer.

Assistant Professors

Cox, Jordan (1986) MS, Brigham Young University, 1984. Computer-aided Engineering.

- Jensen, C. Gregory (1983) MS, Brigham Young University, 1982. Computer Graphics Software, Database Development, Machining.
Magleby, Spencer P. (1989) PhD, University of Wisconsin, Madison, 1988. Computer-aided Design and Manufacture, Intelligent Design Systems.
Sorensen, Carl D. (1987) PhD, Massachusetts Institute of Technology, 1985. Design for Manufacture, Manufacturing Processes.

Graduate Degrees and Programs

MS Mechanical Engineering
MEM Engineering Management
PhD Engineering

Integrated Master's Program

See page 38 of this catalog for a description of the integrated master's program in engineering. Special requirements for this program are basically the same as those for the MS degree in mechanical engineering but include the following:

- I. Application requirements:
 - A. Formal application for admission to the program submitted to the Office of Graduate Studies at beginning of junior year. Admission to graduate school must occur before taking final 30 hours of course work. Application to graduate school must meet usual university graduate application deadlines.
 - B. Cumulative GPA of 3.0 for previous 60 hours of course work.
- II. Degree requirements:
 - A. Cumulative GPA of 3.0 or above in all courses to be counted toward master's degree.
 - B. Study list for both BS and MS programs to be filed at beginning of junior year.

Degree and Program Requirements

MS Mechanical Engineering

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—May 15 (U.S.)
Winter	—June 30 (international)
	—September 15 (U.S.)
Spring	—October 31 (international)
	—February 15 (U.S.)
Summer	—October 31 (international)
	—February 15 (U.S.)
 - B. Entrance examinations:
 1. International applicants must submit GRE General Test and engineering subject test as well as TOEFL scores.
 2. U.S. applicants must prove to the department that they have passed the state fundamentals of engineering (FE, formerly EIT) examination, which the state of Utah offers each April and October.
- II. Prerequisite:

- A. BS degree in mechanical engineering or an allied discipline with approval.
- B. GPA of 3.0 or above in last 60 hours for regular admission.

Requirements for Degree

- I. Credit hours (34–40):
 - A. Thesis option (34): Minimum 34 hours including 9 thesis hours (MeEn 699R), MeEn 591R, and 6 hours of advanced mathematics or equivalent.
 - B. Nonthesis option (40): Minimum 40 course work hours including MeEn 591R and 6 hours of advanced mathematics or equivalent. A maximum of 3 hours of project work, such as 695R, may be included in the 40-hour total.
- II. Submit study list of approved courses during first semester.
- III. Prospectus: Each student on thesis option must submit prospectus before beginning significant work on thesis, preferably during the first semester.
- IV. Residence: See Residence Requirements on page 38.
- V. Examinations:
 - A. FE examination or GRE (if not taken at time of admission).
 - B. Oral defense of thesis for thesis option candidates.
- VI. Usual time requirement: One calendar year.

MEM Engineering Management

See page 109 of this catalog for a description of the interdisciplinary program in engineering management. MEM students who wish to take classes in the Mechanical Engineering Department should consult the department graduate coordinator to be assigned an advisor.

PhD Engineering

Admission and Entry

- I. Semesters of entry and application deadlines:

Fall	—February 28 (international)
	—May 15 (U.S.)
Winter	—June 30 (international)
	—September 15 (U.S.)
Spring	—October 31 (international)
	—February 15 (U.S.)
Summer	—October 31 (international)
	—February 15 (U.S.)

U.S. applicants, entry all terms and semesters; international applicants, fall semester entry preferred.
- II. Entrance examinations: FE (score of 70 percent); or GRE General Test and advanced engineering subject test; and TOEFL (score of 577 minimum).
- III. Prerequisite: BS degree (or equivalent) in mechanical engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a minimum GPA of 3.0 in the last 60 hours of technical and scientific course work. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree

- I. Credit hours: Minimum of 68 semester hours, at least 50 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (MeEn 799R).
 - A. Candidates without a master's degree: Of the 50 hours, a minimum of 38 hours must be graduate-level courses. At least 12 hours of the 50 must be advanced mathematics, statistics, or computer science (portion of which may be upper-division undergraduate level with specific departmental approval), and a minimum of 18 hours of dissertation (MeEn 799R).
 - B. Candidates with a master's degree: With advisory approval, up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics, statistics, or science.
- II. Foreign language and skill requirement:
 - A. Students wishing to use language or a combination of language and skill subjects to meet this requirement should confer with the department.
 - B. Students taking the skill option must complete at least 18 hours of integrated study in mathematics beyond college trigonometry (Math 111 at BYU), statistics, or computer science. The 12 hours of advanced mathematics, statistics, or computer science required in item IA is in addition to this skill requirement.
- III. Study list: The graduate study list must be submitted during the first semester of doctoral study.
- IV. Residence: See Residence Requirements on page 38.
- V. Comprehensive qualifying examination: Written and oral examination given in March and September each year. The examination must be taken in the first year of the PhD program (usually after an MS degree) and can be retaken only once at the next offering. Students must apply in writing, one month in advance, to take the examination.
- VI. Prospectus: Students must submit and successfully defend a written prospectus on their proposed dissertation research topic at least one year before completion of the degree.
- VII. Dissertation.
- VIII. Oral defense of dissertation.

Mechanical Engineering Graduate Courses

- 500. (MeEn-CEEn) Design and Materials Applications. (3)**
 Prerequisite: CEEEn 203; MeEn 372 or CEEEn 321.
 Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability—all as applied to mechanical design.

- 501. (MeEn-CEEn) Stress Analysis and Design of Mechanical Structures. (3) On dem.**
 Prerequisite: CEEEn 321 or MeEn 372.

Stress analysis and deflection of structures; general bending and torsion with computer applications to mechanical and aerospace structure design.

- 502. (MeEn-CEEn) Plasticity and Fracture Mechanics. (3) On dem.**
 Prerequisite: MeEn-CEEn 503.

Continuum theory of plasticity, linear elastic fracture mechanics, introduction to structured continuum theories for polycrystalline media.

- 503. (MeEn-CEEn) Theory of Elasticity. (3)**
 Prerequisite: CEEEn 203, Math 321.

Tensor notation, stress and deformation tensors, constitutive equations, field equations; plane-stress/plane-strain, plate, axisymmetric, thermoelasticity, and large deformation problems.

- 504. (MeEn-CEEn) Matrix Structural Analysis. (3)**
 Prerequisite: CEEEn 321 or MeEn 372.

Matrix notation, principle of virtual forces, flexibility method, principle of virtual displacements, stiffness method, and general purpose computer programs for structural analysis.

- 506. (MeEn-CEEn) Introduction to Finite Element Methods. (3)**
 Prerequisite: CEEEn 321 or MeEn 372; MeEn-CEEn 501 or 504; or instructor's consent.

Finite element stress analysis; mathematical foundations; simplex, isoparametric, bending, and axisymmetric elements; basic 2-D and 3-D modeling techniques; use of FEA computer software and hardware.

- 507. (MeEn-CEEn) Advanced Finite Element Analysis. (3)**
 Prerequisite: CEEEn-MeEn 506

Complex 3-D finite element modeling, multiple element types, and mesh generation techniques. Application to thermal stress, nonlinear materials, and large deformations. Use of CAE software.

- 508. (MeEn-CEEn) Dynamics of Structures and Mechanical Systems. (3)**
 Prerequisite: Math 321; CEEEn 321 or MeEn 372; MeEn 504.

Dynamic analysis of single and multi-degree-of-freedom systems. Ritz approximation, frequency domain analysis, geometric nonlinearity, and material nonlinearity.

- 509. (MeEn-CEEn) Spectral Analysis of Dynamic Systems. (3)**
 Prerequisite: Math 321, CEEEn 204.

Vibrations of elastic bodies and of systems with multiple degrees of freedom; random vibration. Computer-aided vibration testing and analysis.

- 510. Compressible Fluid Flow. (3)**
 Prerequisite: MeEn 312.

One-dimensional analysis of compressible flow with area change, friction, heat transfer, shock waves, and combined effects, including experimental methods.

511. Intermediate Compressible Flow. (3)

Prerequisite: MeEn 510.

Subsonic, transonic, and supersonic multidimensional flow; Basic equations; small perturbation theory; method of characteristics for steady and unsteady flow.

512. Boundary Layer Theory. (3)

Prerequisite: MeEn 312 or instructor's consent.

The stress tensor; Navier-Stokes equations; exact solutions for classical flows; Prandtl's boundary layer equations; separation; Karman-Pohlhausen integral methods; approximate solutions, numerical solutions, and applications.

515. Applied Aerodynamics and Flight Mechanics. (3)

Prerequisite: MeEn 312.

Modern applied aerodynamics including performance, stability, and control of aerospace vehicles.

521. Energy Resources and Conversion. (3)

Prerequisite: MeEn 322 or instructor's consent.

New and conventional energy resources and energy conversion systems using principles of thermodynamics.

531. Design of Control Systems. (3)

Prerequisite: MeEn 435.

Classical frequency response and time domain design of control systems. State variable control and computer simulation of control systems.

534. Dynamic System Analysis and Design. (3)

Prerequisite: MeEn 435.

Lumped models of mechanical, electrical-mechanical, fluid, and thermal systems; graphic models; physical system response; computer simulation; design of dynamic systems.

537. Advanced Mechanisms. (3)

Prerequisite: MeEn 337.

Kinematics and dynamics of advanced mechanisms such as robots with computer simulation of mechanism motion.

541. Numerical Heat Transfer. (3)

Prerequisite: MeEn 440; Math 311 or instructor's consent.

Heat transfer analysis by numerical methods. Finite difference and finite element methods, stability and error analysis, using digital computers.

542. Design of Heat Transfer Systems. (3) On dem.

Prerequisite: MeEn 440.

Design of devices where heat transfer is a predominate effect; practical problems from industry; energy-conservation economics.

553. (MeEn-MFET) Mechanical Behavior of Polymers. (3)

Prerequisite: CEEn 203, MFE 355, or instructor's consent.

Generalized elasticity relations, viscoelasticity, yielding and fracture, crazing, rubber elasticity, anisotropic behavior, processing effects on optical and other properties.

554. Advanced Manufacturing Processes. (3)

Prerequisite: MeEn 250 or instructor's consent.

Analysis of forming, machining, welding, and casting processes, emphasizing metal microstructures. Selection of process parameters, considering economics and material properties.

556. Composite Material Design. (3)

Prerequisite: MeEn 250.

Macro- and micromechanical analysis and design of uni- and multidirectional composite materials.

557. Corrosion. (3)

Prerequisite: Chem 105.

Basic principles, eight common forms of corrosion, testing, materials, applications, modern theory, and high-temperature metal-gas reactions.

570. (MeEn-CEEn) Computer-aided Engineering Software Design. (3)

Prerequisite: C, or similar computer language background.

Programming techniques and structure for interactive engineering design software. Use of engineering library utility routines for user interface, graphics, and data access. Term project required.

571. (MeEn-CEEn) Engineering Computer Graphics and Software Design. (3)

Prerequisite: FORTRAN, C, or similar computer language background.

Application of modern computer graphics techniques to engineering problems, 2-D and 3-D transformations, perspective, hidden surface removal, lighting and shading. Graphics data structures, standards, and device independence. Software design methodology. Term project required.

572. (MeEn-CEEn) Computer-aided Geometric Design. (3)

Prerequisite: FORTRAN, C, or similar computer language background.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects required.

573. CAD Software Development. (3) On dem.

Prerequisite: advanced FORTRAN or C.

Theory and development of CAD 2-D and 3-D systems including programming of curves, surfaces, solids, data fitting, and CAD interfaces.

574. Geometric Modeling with CAD Systems. (3) On dem.

Prerequisite: Math 321, MeEn 371.

Canonical and parametric modeling of basic geometric entities as they apply to mechanical design, including topology, single domain theory, and fractals.

575. (MeEn-CEEn) Optimization Techniques in Engineering. (3)

Prerequisite: Math 321 and FORTRAN, C, or similar computer language background.

Application of nonlinear computer optimization techniques to constrained engineering design. Theory and use of state-of-the-art computer routines.

576. Advanced Methods for Engineering Design. (3)

On dem.

Prerequisite: MeEn 475.

Emerging design methodology and design strategies for complex systems including decomposition methods, sensitivity analysis, robust design, and expert systems in engineering design.

581. Internal Combustion Engines. (3)

Prerequisite: MeEn 322.

Computer modeling of performance and fuel economy, including exhaust emissions of spark-ignition and compression-ignition engines. Theoretical and actual cycles. CFR and production engine dynamometer testing.

584. Gas Turbine and Jet Engine Design. (3)

Prerequisite: MeEn 312, 322.

Design and synthesis of land-based and aircraft gas turbines utilizing fluid flow and thermodynamic fundamentals. Extensive discussion of turbojets, turbofan and turboprop engines.

591R. Seminar. (1)

Graduate seminar to develop oral and written skills for presentation of current topics in mechanical engineering.

595R. Special Topics in Mechanical Engineering. (Arr.)

Prerequisite: department's consent.

611. Theories of Fluid Turbulence. (3) On dem.

Prerequisite: MeEn 312, Math 321.

Theoretical and experimental study, including statistical and phenomenological models. Analyzing classical flow equations using Reynolds convention.

612. Principles of Ideal-Fluid Dynamics. (3) On dem.

Prerequisite: MeEn 312, Math 321.

Ideal-fluid hydrodynamics and aerodynamics, including ideal-fluid assumptions, rotational and irrotational flow, acyclic and cyclic motion, circulation, and lift.

631. Advanced Automatic Control Applications. (3)

Prerequisite: MeEn 531.

Mechanical control system analysis by computer methods; nonlinear methods; applications of modern control theory and computer controllers.

637. Dynamics in Mechanical System Design. (3) On dem.

Prerequisite: MeEn 531 or 534.

Applied design analysis of complex systems needing evaluation of vibrations, transient response, and/or feedback control. Classical, modern, and computer techniques.

641R. Special Topics in Heat-Transfer Theory. (3) On dem.

Prerequisite: MeEn 440.

Analysis of heat transfer in conduction, convection, or radiation.

642. Radiative Heat Transfer. (3)

Prerequisite: MeEn 440 or equivalent.

Engineering analysis of radiant heat exchange between surfaces, in enclosures, and in absorbing, emitting, and scattering media.

643. Convective Heat Transfer. (3)

Prerequisite: MeEn 440 or equivalent.

Engineering analysis of convective heat transfer in internal and external laminar and turbulent flows.

651. Advanced Topics in Manufacturing. (3) On dem.

Prerequisite: MeEn 554 or instructor's consent.

Presentation and evaluation of advanced aspects of material behavior, forming, welding, casting, and machining.

655. Polymer Processing. (3)

Prerequisite: MeEn 312, MFE 355, or instructor's consent.

Rheology and transport phenomena involving polymeric fluids. Analysis of extrusion, calendering, die forming, mixing, compression and injection molding, filament winding, and pultrusion.

692R. Materials Seminar. (0.5) On dem.

Prerequisite: graduate standing in engineering or scientific field.

Advanced topics in materials science and engineering.

695R. Special Problems for Master's Students. (1-3)

Prerequisite: department chair's consent.

697R. Research. (6-9) On dem.**699R. Master's Thesis.** (1-9)**791R. Seminar for Doctoral Students.** (1)**795R. Selected Topics in Mechanical Engineering.** (1-3)**799R. Doctoral Dissertation.** (1-18)

Microbiology

Chair: Donald N. Wright, 775 WIDB, 378-2889

Graduate Coordinator: F. Brent Johnson, 887 WIDB, 378-2331

Faculty/Specialties

Professors

Jensen, James B. (1989) PhD, Auburn University, 1976. Immunology, Parasitology.

Jensen, Marcus M. (1969) PhD, University of California, Los Angeles, 1961. Medical Microbiology, Avian Pathology.

Johnson, F. Brent (1972) PhD, Brigham Young University, 1970. Virology.

Murray, Byron K. (1983) PhD, Brigham Young University, 1971. Virology.

North, James A. (1965) PhD, University of Utah, 1964. Virology.

Sagers, Richard D., (1958) PhD, University of Illinois, 1958. Microbial Biochemistry.

Wright, Donald N. (1969) PhD, Iowa State University of Science and Technology, 1964. Clinical Microbiology.

Associate Professors

- Anderson, Shauna C. (1974) PhD, University of Washington, 1984. Medical Technology, Clinical Chemistry.
Leavitt, Ronald W. (1977) PhD, University of California, San Diego, 1975. Molecular Biology.
Teuscher, Cory (1990) PhD, University of New Mexico, 1982. Immunology.
Woodward, Scott R. (1989) PhD, Utah State University, 1983. Molecular Biology.

Assistant Professors

- Cockayne, Susan (1982) PhD, Brigham Young University, 1990. Medical Technology.
O'Neill, Kim L. (1992) DPhil, New University of Ulster, Northern Ireland, 1986. Genetics, Oncology.
Robison, Richard A. (1991) PhD, Brigham Young University, 1988. Molecular Biology, Immunology.

Graduate Degrees and Programs

- MS, PhD Microbiology
MS, PhD Molecular Biology (Interdepartmental Program)

Areas of Specialization

- MS: Clinical Laboratory Science, Immunology, Microbiology, Physiology, Virology
PhD: Immunology, Microbiology, Physiology, Virology

Degree and Program Requirements*

Admission and Entry

- I. Application Requirements:
 - A. Semesters of entry and application deadlines:
Fall (prefer) —February 1 (U.S. and international)
Winter —June 30 (U.S. and international)
 - B. Entrance examination: GRE General Test.
- II. Statement of intent must explicitly state field of interest and career goals.

*Obtain a copy of the Graduate Student Handbook from the department office (775 WIDB).

MS Microbiology (BS-MS Integrated)

The integrated microbiology program is a five-year curriculum during which students simultaneously work for both the BS and MS in microbiology. The purpose of this program is to increase flexibility of course scheduling, decrease the time normally necessary to complete both degrees independently, and to increase opportunity for student laboratory research. The specific requirements for this program are basically the same as those for the MS degree in microbiology but include the following:

Admission and Entry

- I. Program applications must be received during the sixth semester of study. Students unable to complete all course requirements by the end of a total of five years of matriculation will not be accepted.
- II. Applicants must have a cumulative GPA of not less than 3.3 and no grade lower than a B in major or supportive science courses.

Requirements for Degree

- I. Minimum of 158 credit hours including 30 hours of graduate (500 or 600) level courses, of which 6 thesis hours (Mbio 699R) are required.
- II. Required courses: Math 119, Stat 222, Biol 130, Phscs 105, 106, 107, 108, Chem 105, 106, 107, 226, 351, 352, 353, 481, 582, 584, 689, Zool 503, Mcbio 100, 265, 291, 341, 342, 351, 402, 403, 404, 425, 441, 442, 481, 491R, 502, 504, 691R each semester after acceptance; an additional 18 hours must be completed from graduate-level courses including 695R.
- III. A minor (9 hours) (optional) in biochemistry (courses included under required courses).
- IV. One semester of approved teaching experience.
- V. Thesis: Standard university thesis or journal publication format.
- VI. Examination: Oral examination on thesis and course work.

MS Microbiology

Admission and Entry

- I. See above application requirements.
- II. Prerequisite:
 - A. Baccalaureate degree in microbiology or equivalent discipline.
 - B. One year of inorganic chemistry (including laboratory).
 - C. One semester of quantitative analysis.
 - D. One year of organic chemistry.
 - E. One year of general physics at Phscs 105 level or higher.
 - F. One semester of calculus (Math 119 or equivalent). G. Mcbio 351, 402, 403, 404, or equivalent.
- III. Requirements for Degree
 - A. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Mbio 699R).
 - B. Required courses: Mcbio 691R (attendance required each semester of residence), Chem 481, 582, 584, Zool 503.
 - C. Minor (optional): Any approved minor in biological or physical science.
 - D. Approved teaching experience of one semester.
 - E. Thesis: Standard university thesis or journal publication format.
 - F. Examination: Oral examination on thesis and course work.

MS Molecular Biology (Interdepartmental Program)

Admission and Entry

See above application requirements. Application should be made to the Molecular Biology Program, designating microbiology as the specialization of study. See Molecular Biology section of this catalog.

Requirements for Degree

- I. Requirements noted in items IIA, C, D, E, and F for the MS in microbiology apply.

- II.** Required courses: For minimum degree requirements see Molecular Biology section of this catalog. Additional departmental course requirements include Zool 503 and Mcbio 404, 561, and 691R each semester.

PhD Microbiology

Admission and Entry

See above application requirements.

Requirements for Degree

I. Credit hours:

- A. Candidates without a master's degree: 54 semester hours beyond baccalaureate including no more than 18 hours of dissertation credit.
- B. Minimum of 36 hours beyond master's degree, including 18 hours of dissertation (Mcbio 799R).

- II.** Required courses: Chem 367 or 461; 481, 582, 584; Mcbio 561, 691R (attendance required each semester of residence); Zool 503.

- III.** Minor (optional): Any approved minor in biological or physical science.

- IV.** Two semesters of approved teaching experience.

- V.** Written qualifying examination before selection of dissertation topic (may be waived if master's degree was obtained from BYU).

- VI.** Skill requirement: Experience in statistics required and other courses as required by the advisory committee.

- VII.** Dissertation: Standard university dissertation or journal publication format.

VIII. Examinations:

- A. Written and oral comprehensive examination on completion of skill requirement and all course work.
- B. Oral defense of dissertation.

PhD Molecular Biology (Interdepartmental Program)

Admission and Entry

See above application requirements. Application should be made to the Molecular Biology Program, designating microbiology as the specialization of study. See Molecular Biology section of this catalog.

Requirements for Degree

- I.** Requirements noted in items I, IV, V, VI, VII, and VIII for the PhD in microbiology apply.
- II.** Required courses: For minimum degree requirements see Molecular Biology section of this catalog. Additional departmental course requirements include Mcbio 632, 691R each semester, Chem 367 or 461, Zool 503, and one of Mcbio 502, 611, 504, or 551.
- III.** Minor: Only approved minor in biological or physical science. None is required.

Program and Degree Resources

See College of Biology and Agriculture section of this catalog for statement on research facilities and projects.

Microbiology Graduate Courses

502. Immunobiology. (4)

Prerequisite: Mcbio 402 or equivalent.

Literature review of current topics in immunology.

504. Molecular Biology of Animal Viruses. (4)

Prerequisite: Mcbio 404 or equivalent.

Molecular aspects of viral replication and infection.

551. Microbial Physiology. (5)

Prerequisite: Mcbio 351, Chem 481.

561. Radioisotope Methods. (2)

Prerequisite: college physics.

601. Molecular Approaches to Microbial Pathogenesis. (2)

Prerequisite: Mcbio 403.

Mechanisms of pathogenesis in host-parasite relationships.

611. Cellular Immunology and Immunogenetics. (2)

Prerequisite: Mcbio 502.

629. Advanced Clinical Laboratory Science. (3)

Clinical techniques and their relationship to disease. Topics in hematology, microbiology, immunohematology, and clinical chemistry.

631. Molecular Mechanisms in Virology. (2)

Prerequisite: Mcbio 504; Chem 581 or equivalent.

Selected topics in molecular functions of animal viruses.

632. Cell and Tissue Culture Techniques. (2) Even yr.

Prerequisite: Mcbio 504; Chem 581 or equivalent.

Advanced procedures in cell culture.

642. Molecular Biology of the Cell. (3) Odd yr.

Prerequisite: Mcbio 441.

Structure and function of the prokaryotic and eukaryotic cells at the molecular level. Emphasis on molecular aspects of membranes, cytoskeleton, organelles, cell-to-cell communication, and cell movement.

651R. Special Topics in Microbiology. (1-2)

652R. Special Topics in Clinical Laboratory Science. (1-2)

671. Clinical Correlation. (2)

Correlating laboratory data with the diagnosis, pathogenesis, progress, and treatment of disease.

691R. Graduate Seminar. (1)

695R. Research. (Arr.)

699R. Master's Thesis. (1-9)

799R. Doctoral Dissertation. (1-9)

Molecular Biology

Program Coordinator: Donald N. Wright, 775 WIDB,
378-2889

Graduate Degrees and Programs

MS, PhD Molecular Biology

Graduate study in molecular biology at Brigham Young University is an integrated multidepartmental program. The MS degree can be taken through any department in the college (Agronomy and Horticulture, Animal Science, Botany and Range Science, Food Science and Nutrition, Microbiology, Zoology). The PhD degree can be taken through the Departments of Botany and Range Science, Microbiology, and Zoology. Students should refer to the department of interest for specific requirements.

Degree and Program Requirements

Admission and Entry

- I. Application requirements:
 - A. Students wishing to obtain a graduate degree in molecular biology must make application to the molecular biology program.
 - B. Deadlines: February 1 for fall semester to receive full consideration for first-round acceptance and awarding of financial assistance.
 - C. Entrance examination: GRE General Test. Scores must be submitted with application to be considered for regular admission.
- II. Statement of intent must explicitly state field of interest, department preference, and career goals.

MS Molecular Biology

Admission and Entry

- I. See above application requirements.
- II. Prerequisite:
 - A. Baccalaureate degree in molecular biology or biological or physical science.
 - B. One year of general university physics, mathematics equivalent to Math 119, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342.

Requirements for Degree

- I. Credit hours (minimum 30): Minimum 24 course work hours plus 6 thesis hours.
- II. Minimum requirements include Chem 481, 582, 586; Stat 501 or 337; Mcbio 351, 425, 441, 442; Mcbio 642 or Zool 526.
- III. See sponsoring department for departmental requirements.

PhD Molecular Biology

Admission and Entry

- I. See above application requirements.
- II. Prerequisite:
 - A. Baccalaureate degree in molecular biology or biological or physical science.

B. One year of general university physics, mathematics equivalent to Math 119, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342.

Requirements for Degree

- I. Credit hours:
 - A. Candidates without a master's degree: 54 semester hours beyond baccalaureate degree, including no more than 18 hours of dissertation credit.
 - B. Minimum of 36 hours beyond master's degree, including 18 hours of dissertation.
- II. Same minimum course requirements as for molecular biology MS
- III. See sponsoring department for departmental requirements.

Music

Chair: Clyn D. Barrus, C-550 HFAC, 378-6304

Graduate Coordinator: Glenn R. Williams, E-466 HFAC, 378-3317

Faculty/Specialties

Professors

- Barrus, Clyn D. (1985) DMA, University of Michigan, 1971. Orchestral Conducting, String Performance/Pedagogy.
Belnap, Parley L. (1965) DMA, University of Colorado, 1975. Organ Performance/Pedagogy.
Bradshaw, Merrill K. (1957) DMA, University of Illinois, 1962. Theory/Composition.
Dalton, David J. (1963) DM, Indiana University, Bloomington, 1970. String Performance/Pedagogy.
Dayley, K. Newell (1970) DA, University of Northern Colorado, 1986. Brass Performance/Pedagogy.
Drinkall, Roger (1989) MM, University of Illinois, 1962. String Performance/Pedagogy.
Durham, Thomas L. (1978) PhD, University of Iowa, 1978. Theory/Composition.
Mason, James A., Dean (1957) EdD, Arizona State University, 1970. Music Education.
Pollei, Paul C. (1963) PhD, Florida State University, 1975. Piano Performance/Pedagogy.
Powley, E. Harrison (1969) PhD, University of Rochester, 1974. Musicology.
Pratt, Rosalie Rebollo (1979) EdD, Columbia University, 1976. Music Education.
Randall, David M. (1970) DMA, University of Iowa, 1970. Woodwind Performance/Pedagogy.
Robison, Clayne W. (1973) DMA, University of Washington, 1973. Vocal Performance/Pedagogy.
Sargent, David H. (1976) DMA, University of Illinois, 1975. Theory/Composition.
Staheli, Ronald J. (1978) DMA, University of Southern California, 1977. Choral Conducting.
Stuart-Bachelder, Lila R. (1986) DM, Indiana University, 1993. Vocal Performance / Pedagogy.
Williams, Glenn R. (1965) DMA, University of Rochester, 1961. Woodwind Performance/Pedagogy.

Associate Professors

- Bachelder, Daniel F. (1975) PhD, Brigham Young University, 1976. Brass Performance/Pedagogy.
- Blackinton, David P. (1980) DMA, Catholic University of America, 1975. Band Conducting, Brass Performance/Pedagogy.
- Bush, Douglas E. (1978) PhD, University of Texas, 1982. Musicology.
- Hicks, Michael D. (1986) DMA, University of Illinois, 1984. Theory/Composition.
- Hopkin, J. Arden (1990) DMA, University of Rochester, 1978. Voice Performance/Pedagogy.
- Jesson, Scott Gordon (1980) PhD, Brigham Young University, 1980. Music Education.
- Kenney, Susan Hobson (1977) MA, Brigham Young University, 1978. Elementary Music Education.
- Lowe, Laurence M. (1993) MM, University of Rochester, 1981. Brass Performance/Pedagogy.
- Peterson, Donald L. (1986) DMA, Arizona State University, 1986. Music Education.
- Shumway, Jeffrey L. (1985) DM, Indiana University, 1982. Piano Performance/Pedagogy.
- Smith, Raymond (1982) DM, Indiana University, 1982. Woodwind Performance/Pedagogy.
- Stuart, Lila R. (1986) MM, Indiana University, 1968. Vocal Performance/Pedagogy.
- Wilberg, Mack J. (1984) DMA, University of Southern California, 1985. Choral Conducting.

Assistant Professors

- Anderson, Richard Paul (1972) DMA, University of Colorado, 1986. Piano Pedagogy.
- Bean, Matthew W. (1991) DMA, Indiana University, 1991. Musical Dance Theatre.
- Brough, Ronald P. (1984) MM, North Texas State University, 1983. Percussion Performance and Pedagogy.
- Cook, R. Donald (1991) DMA, University of Kansas, 1987. Organ Performance and Pedagogy.
- Giovannetti, Geralyn (1990) DMA, University of Michigan, 1990. Woodwind Performance and Pedagogy.
- Johnson, Steven P. (1987) PhD, University of California, Los Angeles, 1989. Musicology.
- Jones, Stephen M. (1991) DMA, University of Cincinnati, 1989. Theory/Composition.
- Smith, Robert Baily (1967) MA, Brigham Young University, 1967. Piano Performance/Pedagogy.

Graduate Degrees and Programs

MA, MM, PhD Music

Areas of Specialization

MA: Music Education, Musicology
 MM: Composition, Conducting, Music Education, Performance, Pedagogy
 PhD: Musicology

Degree and Program Requirements

Please consult the current edition of the Department of Music Graduate Handbook for specific materials related to applying to a program.

Admission and Entry

All graduate programs in music have the same admission and entry requirements. Consult the Department of Music and the Department of Music Graduate Handbook for specific application and program requirements.

- I. Application requirements for all graduate music majors:
 - A. Semesters of entry and application deadlines:
 Fall —February 1 (U.S. and international)
 Summer —February 1 (U.S. and international)
 Fall semester entry only, except applicants for MM and MA in music education, who must enter summer term.
 - B. Entrance examination: GRE music subject test; score must be received before admission.
 - C. Sample research paper: International students whose principal language is not English must submit a sample research paper that demonstrates adequate ability to write in English. This paper should be submitted to the Department of Music at the time completed application forms are submitted to Graduate Admissions.
 - D. Graduate performance audition: For specialization in performance and pedagogy.

MA Music**Admission and Entry**

See preceding general requirements.

Requirements for Specialization in Music Education

- I. Prerequisite: Baccalaureate degree in music or equivalent.
- II. Credit hours (32): Minimum 26 course hours plus 6 thesis hours (Music 699R).
- III. Required courses:
 - A. Music 501, 699R; 4 hours from Music 671, 672, 673, 674, 675; Stat 552.
 - B. Electives: 8–10 hours from graduate music courses and 7–9 hours from graduate courses outside the music field.
- IV. Thesis.
- V. Examinations:
 - A. Comprehensive examination.
 - B. Defense of thesis.

Requirements for Specialization in Musicology

- I. Prerequisite: Baccalaureate degree in music or equivalent.
- II. Credit hours (32): Minimum 26 course work hours plus 6 thesis hours (Music 699R).
- III. Required courses:
 - A. Music 500, 607A,B, 699R; any 12 hours from 601, 602, 603, 604, 605, 606.
 - B. Electives: 8 hours.
- IV. Minor (optional): Consult with department.
- V. Thesis.
- VI. Examinations:
 - A. Department language proficiency examination in French, German, or Latin.
 - B. Comprehensive examination.
 - C. Defense of thesis.

MM Music**Admission and Entry**

See preceding general requirements.

Requirements for Specialization in Composition**I. Prerequisite:**

- A. Baccalaureate degree in music composition or equivalent in previous training.
- B. Portfolio of four works in various media and forms and a tape of two or more of these compositions.
- II. Credit hours (32): Minimum 26 course work hours plus 6 master's composition hours (Music 688R).
- III. Required courses:
 - A. Music 500, 503, 606, 687R (6 hours) 688R (6 hours); 3 hours from 601, 602, 603, 604, 605; 6 hours from 581, 583, 591, 596, 683.
 - B. Electives: 3 hours.
- IV. Recital: Strongly recommended.
- V. Project.
- VI. Examination: Final oral examination and defense of project.

Requirements for Specialization in Conducting**I. Prerequisite:**

- A. Baccalaureate degree in music.
- B. Performance and conducting audition.
- II. Credit hours: Minimum 32 course work hours.
- III. Required courses:
 - A. Music 500, 600R (conducting, 4 hours), ensemble (2 hours), 697A,B.
 - B. Band emphasis: Music 510, 532, 595, and electives in addition to item IV below (8 hours).
 - C. Choral emphasis: Music 506, 507, 533R (4 hours), 664, and electives in addition to item IV below (6 hours).
 - D. Orchestra emphasis: Music 508, 509, 532, 595, and electives in addition to item IV below (6 hours).

- IV. Electives: 6 hours in nonperformance music graduate courses (as approved by advisory committee) from one or more of the following areas: music education, music history, or music theory.
- V. Examinations:
 - A. Jury examination each semester of enrollment in 660R.
 - B. Repertory examination.
 - C. Final oral examination.
- VI. Closure project: Music 697A, B.

Requirements for Specialization in Music Education

- I. Prerequisite: Public school music teacher certification.
- II. Credit hours: Minimum 32 course work hours including a professional improvement project (Music 698A,B).
- III. Required courses: Music 501, 595, 673, 674, 675; 6 hours from 532R, 533R, 534R, 535R; 4 hours from 560R; 698A, B.
- IV. Project.

- V. Examination: Final oral examination and defense of project.

Requirements for Specialization in Performance and Pedagogy**I. Prerequisite:**

- A. Baccalaureate degree in performance or pedagogy or equivalent.
- B. Performance audition.
- C. Proficiency in German, French, and Italian dictation for voice candidates.

II. Credit hours: Minimum 32 course work hours.**III. Required courses:**

- A. Music 500, 660R (4 hours), ensemble (2 hours).
- B. Voice or orchestral instrument emphasis: Music 505, 665, 670R (2 hours), 694R in applied literature (2 hours), 697A, B (4 hours) or 649R (2 hours), and electives in addition to item IV below (5–7 hours).
- C. Keyboard instrument emphasis: Music 505, 591, 665, 670R (2 hours), 694R in applied literature (2 hours), 697A, B (4 hours) or 649R (2 hours), and electives in addition to item IV below (3–5 hours). The ensemble requirement in item A above includes 644R.

IV. Electives: 6 hours in nonperformance music graduate courses (as approved by advisory committee) from one or more of the following areas: music education, music history, or music theory.**V. Examinations:**

- A. Jury examination each semester of enrollment in 660R.
- B. Repertory examination.
- C. Final oral examination.

VI. Closure project: The 697A,B sequence is the recommended closure project for the degree. With approval from the advisory committee, a student may select the solo recital (649R) option.**PhD Music****Admission and Entry**

See preceding general requirements.

Requirements for Specialization in Musicology

- I. Prerequisite: Baccalaureate degree in music; master's degree in musicology or equivalent.
- II. Credit hours (86 beyond baccalaureate, 56–58 beyond master's): Minimum of 68 course work hours beyond the baccalaureate degree or 38–40 hours beyond the master's degree (subject to approval by the advisory committee), plus 18 dissertation hours (Music 799R).
- III. Required courses: Music 500, 596, 601, 602, 603, 604, 605, 606, 608A,B, 699R (thesis, 6 hours), 701A,B, 799R (dissertation, 18 hours).
- IV. 8 hours from a single cognate field outside the Department of Music (e.g., linguistics, philosophy, German literature, etc.).
- V. Language requirement: Pass departmental examinations in French, German, and Latin (additional languages may be required by advisory committee if necessary for candidate's research).

- VI. Dissertation.
 VII. Examinations:
 A. Comprehensive examination.
 B. Oral defense of dissertation.

Music Graduate Courses

500. Musical Research Techniques. (2)

Prerequisite: graduate standing.

501. Music Education Research Techniques. (2)

Prerequisite: graduate standing.

503. Aesthetics. (3) On dem.

Fundamental questions of aesthetic theory from classical antiquity to the present, emphasizing musical aesthetics.

505R. Applied Literature. (2) On dem.

Prerequisite: minimum of one enrollment in Music 402–407.

Continuation of Music 402–407.

506. Choral Literature 1. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of choral literature through Beethoven.

507. Choral Literature 2. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of choral literature from post-Beethoven to the present.

508. Orchestra Literature 1. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of orchestral literature of the baroque and classical eras.

509. Orchestra Literature 2. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of orchestral literature of the romantic era and the twentieth century.

510. Band Literature. (2)

Prerequisite: instructor's consent.

Concentrated study of band literature through analysis and conducting.

532. Score Preparation and Conducting: Instrumental. (2)

533R. Score Preparation and Conducting: Choral. (2)

534R. Score Preparation and Direction: Jazz. (2)

560R. Performance Instruction. (2)

Prerequisite: graduate music major status.

Performance instruction for students not specializing in performance and pedagogy, and for performance and pedagogy students wishing to study secondary instruments. \$190 fee.

570. Music for Elementary School Teachers. (2) On dem.

Prerequisite: Music 371, 471, or elementary music teaching experience.

Experiences in teaching various music activities in the elementary school.

571. Elementary Education Music Pedagogy. (2) On dem.

Prerequisite: Music 371 and equivalent of elementary education teaching minor in music.

Orff, Dalcroze, and Kodaly materials and techniques.

575R. Summer Music Workshops and Clinics. (1–2)

576. Fundamentals and Techniques of the Marching Band. (2) On dem.

Prerequisite: Music 294, 296.

Planning, charting, and scoring for marching bands. For music education majors only.

581. Twentieth-Century Orchestration. (3)

Prerequisite: Music 481.

New techniques for standard and new instruments; analysis and listening.

583. Sixteenth-Century Counterpoint. (3)

Prerequisite: Music 483.

Strict modal counterpoint in sixteenth-century style (Palestrina); includes species, text setting, and motet.

591. Advanced Topics in Keyboard Harmony. (2) On dem.

Prerequisite: Music 407.

Topics vary.

595. Score Analysis. (2)

Analysis of representative choral and instrumental works from the Renaissance through contemporary styles.

596. Schenker Analysis. (3) On dem.

Prerequisite: Music 395 or equivalent.

Schenker's system of tonal analysis.

599R. Cooperative Education. (1–6)

Prerequisite: instructor's consent.

Internship in creative, performing, producing, or teaching applications of major course work.

600R. Topics in Music. (1–3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

601. Music in the Middle Ages. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

602. Music in the Renaissance. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

603. Music in the Baroque Era. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

604. Music in the Classic Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

605. Music in the Romantic Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

606. Music of the Contemporary Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

607A. Seminar in Musicology. (2)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

607B. Seminar in Musicology. (2)

Prerequisite: Music 607A.

608A. History of Notation and Paleography 1. (3)
Prerequisite: Music 301, 302, 303, 304, 601, or equivalent.

Notation from the early Christian chant to approximately 1400.

608B. History of Notation and Paleography 2. (3)
Prerequisite: Music 608A.

Offered same year as Music 608A. Notation from approximately 1400 to 1625, including tablatures.

614R. Concert Choir. (1)

615R. University Singers. (1)

619R. Music Theatre Performance. (1-3)

626R. Wind Symphony. (1)

634R. Synthesis. (1)

638R. Philharmonic Orchestra. (1)

639R. Chamber Orchestra. (1)

641R. Brass Chamber Music. (1)

642R. Early Music Ensemble. (1)

643R. Guitar Ensemble. (1)

644R. Keyboard Ensemble. (1)

645R. Percussion Ensemble. (1)

646R. String Chamber Music. (1)

647R. Vocal Chamber Music. (1)

648R. Woodwind Chamber Music. (1)

649R. Solo Recital. (2)

Prerequisite: concurrent registration in Music 660R.
Recital fee in addition to private lessons.

660R. Performance Instruction: Major. (2)

Prerequisite: completion of undergraduate performance proficiency requirements and audition; for performance and pedagogy specialization; primary instrument only.
\$190 fee.

664. Choral Development. (2)

Prerequisite: instructor's consent.

Conducting and teaching skills as principles of choral artistry are studied.

665. Pedagogy. (2) On dem.

Prerequisite: completion of appropriate undergraduate pedagogy courses or equivalent.

Advanced pedagogical studies.

670R. Supervised Teaching. (2)

Prerequisite: graduate music major status.
Supervised private and group instruction.

671. Influence of Music on Behavior. (2)

Variables that influence musical behavior and effects of music on nonmusical behavior.

672. Psychology of Music. (2) On dem.

Psychoacoustical properties of musical phenomena and the neurological aspects of music perception and performance.

673. Historical and Social Foundations of Music Education. (2)

Leaders, events, and trends in history of music education, emphasizing sociological implications.

674. Philosophical and Aesthetic Foundations of Music Education. (2)

Questions related to teaching music in the public schools.

675. Theories of Music Learning and Motivation. (2)

Applications of psychology to teaching and learning of music. Research paper required.

679R. Special Lectures in Music Education. (1-5)

Prerequisite: certification in music plus teaching experience.

683. Twentieth-Century Counterpoint. (3) On dem.

Prerequisite: Music 583.

Counterpoint from the works of Schoenberg, Stravinsky, Crumb, Lutoslawski, and others.

684. Advanced Fugue. (3) On dem.

Prerequisite: Music 483.

Fugues in Bach's *Well-tempered Clavier* and other exemplary works.

687R. Composition. (3)

688R. Composition for Master's Degree. (1-6)

Prerequisite: graduate music faculty's consent, based on evidence of ability in composition manifested in preliminary work.

694R. Independent Readings. (1-3)

Prerequisite: advisory committee's consent.

697A. Scholarly Paper for Master of Music Degree. (2)

Preparation of formal paper related to music of graduate recital. Supervised by a member of music history and literature faculty as directed by the student's graduate advisor.

697B. Recital. (2)

Prerequisite: Music 697A and advisory committee's and graduate music faculty's consent.

698A. Master's Project—Professional Improvement Project. (2)

Identifying and delineating a project. Study list constructed and advisor assigned.

698B. Master's Project—Professional Improvement Project. (2)

Presentation of project and written report.

699R. Master's Thesis. (1-9)

Prerequisite: department graduate faculty's consent.

700R. Seminar in Music. (1-3) On dem.

Prerequisite: Music 500 or 501 (or equivalent) and graduate advisory committee's consent.

799R. Doctoral Dissertation. (1-9)

Prerequisite: department graduate faculty's consent.

Nursing

Graduate Coordinator: Mary Williams, 594 SWKT,
378-5626

Faculty/Specialties

Professors

Isaacs, Patricia C. (1977) EdD, Brigham Young University, 1988. Feeding Regimens in Infants and Children, Growth and Development.
Leifson, June (1971) PhD, Brigham Young University, 1979. Community Assessment, Handicapped Children, Family.

Associate Professors

Duke, Lee (1993) EDD, Brigham Young University, 1988. Relationships Between Nurse Education Administrators, Leadership Behaviors, Empowerment of Nursing Faculty and Students.
Fosbinder, Donna (1990) DNSc, University of San Diego, 1990. Nursing Administration, Patient Perceptions of Nursing Care.
Hammond, Kathleen B. (1964) MS, University of Utah, 1964. Nursing Administration, Psychiatric Nursing.
Jensen, Marian (1970) EdD, Brigham Young University, 1992. Cardiovascular Risk Factors.
Lyons, Marilyn (1966) DNSc, Rush University, 1983. Immunology, Alzheimer's Disease, Neurology, Neurosurgery.
Mandleco, Barbara L. (1977) PhD, Brigham Young University, 1991. Growth and Development, Resilience in Children.
Murphy, Millene (1985) PhD, Brigham Young University, 1982. Neuropsychology, Cognitive Function in Relation to Development, Alzheimer's Disease.
Richardson, Norma (1967) MA, New York University, 1966. Nursing Administration.
Rogers, Sandra (1980) DNSc, University of California, San Francisco, 1989. Primary Health Care, International Health.
Sorensen, Elaine S. (1987) PhD, University of Utah, 1987. Children and Stress, AIDS.
Tillery, Chloe Ann. (1967) MEd, Columbia University, 1968. Physiology.
Williams, Mary (1978) PhD, University of Arizona, 1991. Transplant Anxiety, Management, Qualitative Methodology.

Assistant Professor

Schwartz, Rosanne (1981) PhD, University of Florida, 1991. Oxygenation in Neonates.

Associate Clinical Professors

Anderson, Vickie Lane (1980) MS, Brigham Young University, 1983. Nurse Practitioner.
Mangum, Sandra S. (1983) MN, University of Washington, 1962. Computer Simulations, Professional Issues.
Riddle, Lana B. (1971) PhD, Texas Woman's University, 1984. Capsular Contracture in Mammoplasty, Clinical Problems.

Graduate Degree and Program

MS Nursing

Areas of Specialization

Family Nurse Practitioner, Nursing Administration

The master of science degree program emphasizes clinical expertise and includes graduate-level nursing theories and concepts as well as extensive clinical experience. Research is an important component of the program. Students are required to write a thesis or develop an innovative project.

The graduate program has four major goals: (1) to prepare expert clinicians in a nursing specialty; (2) to prepare leaders who implement changes in health care; (3) to prepare nurses who conduct research for solutions to clinical, educational, or administrative problems; and (4) to prepare nurses for doctoral study.

Joint Program with Other Disciplines

The university has approved two programs whereby qualified students may obtain the MS jointly with the MBA or MPA degrees. Contact the College of Nursing for details.

Degree and Program Requirements

MS Nursing

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 1 (U.S. and international)
Spring —October 31 (international)
—December 1 (U.S.)
 - B. Three letters of recommendation from former teachers or employers.
 - C. Brief (three pages or fewer) prepared statement of personal philosophy and goals for graduate education.
 - D. GPA: Minimum GPA of 3.0 for last 60 hours.
 - E. Interview.
 - F. GRE General Test.
 - G. Resumé.
- II. Prerequisite:
 - A. Baccalaureate degree in nursing from an NLN-accredited program. Graduates from state-approved programs will be admitted on demonstration of professional proficiency equivalent to that of students from NLN-accredited programs.
 - B. Current RN licensure in Utah.
 - C. Completion of basic statistics course.
- III. Access to automobile: Candidates may be required to travel to gain experience in a variety of hospitals and clinics and to visit agencies and client homes; therefore, access to a car is necessary.
- IV. Student malpractice: Candidates are required to carry student liability insurance. The fee is \$12 per enrollment year, to be paid at the time of registration.

Requirements for Degree

I. Credit hours:

A. Nursing administration specialization (42): Minimum of 36 course work hours plus 6 thesis hours (Nurs 699R).

B. Family nurse practitioner specialization (43–48): Minimum of 37 course work hours plus 6 thesis hours (Nurs 699R) or 37–40 course work hours plus 3–6 project hours (Nurs 698R).

II. Required courses:

A. Nursing administration specialization: Nurs 600, 601, 602, 603; 611, 612, 613, 614; 699R; OrgB 630; MBA 500, 501; PMgt 660; IS 301.

B. Family nurse practitioner specialization: Nurs 553, 554, 555, 600, 601, 602, 603, 620, 622, 625, 630, 632, 635, and 698R or 699R.

III. Electives determined in consultation with advisory committee.

IV. Thesis: Thesis or project.

V. Examination: Oral defense of thesis or project.

Program and Degree Resources

Clinical facilities

Comprehensive Clinic

Physiology Laboratory

Research center

Nursing Graduate Courses

510R. Special Programs and Projects. (1–4)

Prerequisite: instructor's consent.

551. Health Assessment. (3)

Development of physical assessment techniques.

553. Family and Community Dynamics. (2)

Examination of concepts, theories, and issues central to families and community health.

554. Health Promotion Across the Life Span. (3)

Application of biophysical, cognitive, and psychosocial development concepts in promoting health in various age groups.

555. Pharmacology in Advanced Practice. (3)

Principles of pharmacology and drug therapy for nurse practitioners.

580. Nursing Informatics. (3)

Prerequisite: admission to nursing major.

Use of computer technology in nursing research, client care, and education.

590R. Independent Study. (1–4)

Prerequisite: instructor's consent.

Individualized study.

600. Nursing Science 1. (2)

Critical examination of the development and use of knowledge and theory in advancing the science of nursing.

601. Nursing Science 2. (2)

Prerequisite: Nurs 600.

Critical examination of research methods used to develop and test theory and expand nursing knowledge.

602. Nursing Science 3. (1)

Prerequisite: 600, 601.

Development of writing skills through preparation of thesis or project proposal.

603. Nursing Issues and Health Policy. (2)

Exploration of issues facing nurses in advanced practice; role of nurses in identifying, formulating, legitimizing, and implementing health policy.

611. Strategic Planning, Marketing, and Evaluation in Health Care Systems. (3)

Acquiring the language, strategies, and techniques of marketing, planning, and decision making in health care organizations.

612. Administrative-Management Theories. (3)

Analysis and evaluation of leadership, management, and organizational concepts and theories for effective nursing administration.

613. Financial Management in Nursing. (3)

Examination of public and private financing of the health care environment.

614. Administrative Residency. (3)

Prerequisite: Nurs 611, 612, 613.

Development of managerial skills in a nursing administration practicum.

620. Pathophysiology and Diagnostic Testing. (3)

Physiologic basis for therapy in complex clinical problems; development of laboratory testing skills.

622. Diagnosis and Management of Common Disorders. (6)

Prerequisite: Nurs 551; 554 and 555 or concurrent registration.

Diagnosis and management of common psychological, physiological, and pathophysiological alterations in health status.

625. Advanced Practice Seminar. (1)

Prerequisite: concurrent registration in Nurs 635 or 645.

Examination of the issues facing the nurse practitioner.

630. Diagnosis and Management of Chronic Family Health Problems. (5)

Prerequisite: Nurs 553, 620, 622.

Diagnosis and management of chronic psychosocial, physiological, and pathophysiological conditions in families.

632. Diagnosis and Management of Acute Family Health Problems. (4)

Prerequisite: Nurs 630.

Diagnosis and management of acute psychosocial, physiological, and pathophysiological conditions in families.

635. Advanced Practice as a Family Nurse Practitioner. (6–8)

Prerequisite: Nurs 632.

Internship as a family nurse practitioner.

698R. Project. (1–6)

Prerequisite: committee's consent.

Master's project.

699R. Master's Thesis. (1–6)
Prerequisite: committee's consent.

Organizational Behavior

Program Director: W. Gibb Dyer, 790 TNRB, 378-2664

Faculty/Specialties

Professors

- Cherrington, David J. (1973) DBA, Indiana University, Bloomington, 1970. Personnel Management, Organizational Behavior and Ethics.
- Pace, R. Wayne (1978) PhD, Purdue University, 1960. Work Motivation and Vitality, Human Resources, Organizational Communication.
- Perry, Lee T. (1985) PhD, Yale University, 1982. Strategies in Declining Organizations, Behavioral Implications of Mergers and Acquisitions, Radical Product Innovation, Competitive Strategy.
- Peterson, Brent D. (1972) PhD, Ohio University, 1970. Human Resources, Consulting.
- Ritchie, J. Bonner (1973) PhD, University of California, Berkeley, 1968. Organizational Philosophy and Theory.
- Stephan, Eric G. (1968) PhD, University of Utah, 1966. Management, Leadership, Organization Revitalization.
- Wilkins, Alan L. (1978) PhD, Stanford University, 1979. Organizational Culture and Control.
- Woodworth, Warner P. (1976) PhD, University of Michigan, 1974. Industrial Democracy, Worker Ownership, International Development.

Associate Professors

- Dyer, W. Gibb, Jr. (1984) PhD, Massachusetts Institute of Technology, 1984. Organizational Culture, Entrepreneurship, Management of Family-owned Firms, Organizational Change.
- Kirkham, Kate L. (1978) PhD, Union Graduate School, 1977. Organizational Development, Diversity.
- Meek, Christopher B. (1984) PhD, Cornell University, 1983. International Development, Cross-cultural Analysis in Organizational Behavior, Labor-Management Cooperation, Employee Ownership.

Assistant Professor

- Gregersen, Hal B. (1992) PhD, University of California, Irvine, 1989. Organizational Change, International Management, Cross-cultural Management.

Graduate Degree and Program MOB Organizational Behavior

Organizational behavior is a relatively new professional field dedicated to creating compatibility between organizational goals and human values. Emphasizing the applied behavioral sciences, this two-year professional program is designed to prepare competent and ethical specialists. The master's degree program in organizational behavior is small, highly selective, and designed to meet the needs of individuals in two categories: (1) those who wish to take a position in an organization working in human resource management, training and development, labor relations, and internal consulting; and (2)

those who plan to pursue a doctoral degree in organizational behavior and then to enter university teaching, consulting, or equivalent positions in industry.

Degree and Program Requirements

MOB Organizational Behavior

See the Marriott School of Management Graduate Catalog for details regarding this program.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 28 (international)
—May 15 (U.S.)
 - B. Entrance examination: GMAT or GRE General Test
 - C. GPA: Minimum of 3.0 on 4.0 scale for last 60 hours.
- II. Prerequisite: Baccalaureate degree in compatible field.
- III. Interpersonal competence; interests and values consistent with a career in organizational behavior.

Requirements for Degree

Students in this program who do not have an undergraduate business degree will be required to take the management core. All MOB students will also take the following organizational behavior required courses: OrgB 601, 602, 603, 604, 605, 607, and 680. By doing this, all students will fulfill AACSB requirements for a well-rounded business education, as well as develop in-depth expertise in organizational behavior.

Organizational Behavior Graduate Courses

531. Managing Entrepreneurial Firms and Family Businesses. (3)

Issues and problems faced by managers of entrepreneurial enterprises and leaders of family-owned businesses.

551. Theory and Practice of Third-World Development. (3)

Paradigms of economic development; strategies and applications in various societies.

561. Labor Relations. (3)

Overview of the U.S. system of industrial relations and collective bargaining; evolution of unionism and labor-management relations, labor law, union-organizing campaigns, contract negotiation, and arbitration procedures.

601. Introduction to Organizational Paradigms. (3)

Majors only.

An introduction to the historical development and application of alternative organizational paradigms. Students will consider the implications of these paradigms for understanding and influencing organizational behavior.

602. Organizational Behavior Theory for Diagnosis. (3)

(3) Majors only.

An examination of the theoretical foundations for organizational diagnosis. Particular emphasis is given to building diagnostic models and frameworks.

603. Research Design and Data Analysis. (3) Majors only.

The philosophy of science as it relates to research methodology; both qualitative and quantitative methods of data gathering and analysis.

604. Dynamics of Organizational Change:

Interventions and Strategies. (3) Majors only.

An examination of the forces operating to induce or resist change in organizations; current models and methods for organizational intervention and the intervention process.

605. Human Resource Management. (3)

An analysis of human resource functions, including HR planning, staffing, interviewing, selection, performance evaluation, training and development, compensation and benefits, labor relations, and labor laws.

607. Strategic Management: Issues and Perspectives.

(3) Majors only.

An examination of several approaches to strategic thinking to gain appreciation for strengths and weaknesses; insights applied to current strategic issues.

610. Management Philosophy and Style. (3)

A review of contemporary models of management and the development of a philosophy of management.

614. Organizational Communication. (3)

Theory and research of organizational communication as the basis for understanding human resource development.

616. Industrial Democracy. (3)

An analysis of contemporary efforts to restructure the workplace, including co-determination, self-management, cooperatives, and other quality-of-work-life schemes, especially in the U.S. and Europe.

630. Dynamics of Interpersonal Behavior. (3)

An application of skills in problem diagnosis, empathy, and communications in group and interpersonal settings.

635. Diagnosing Human Resources. (3)

Theories, philosophies, and methods involved in documenting needs in human resource development.

636. Diversity and Discrimination in Organizations. (3)

A study of the dynamics of difference and discrimination in organizations, considered from three perspectives: interpersonal, intergroup, and institutional. This course provides a model that has helped managers analyze discrimination and work more effectively with different employee populations.

637. Developing Human Resources. (3)

Theories, methods, and procedures of human resource development.

645. Managing Organization Cultures. (3)

An examination of the insights and skills used to diagnose the relationship between organizational mission and organizational culture. Primarily oriented toward getting students into organizations where they can apply and improve their skills and insights. The study of organizational culture involves an examination of the patterned customs and meanings of a particular group, such as taken-for-granted assumptions, values, and conceptual frameworks.

657. Design, Media, and Computers in Human Resource Development. (3)

Production and use of audio, visual, and video materials for training and human resource development.

660R (OrgB-MBA 647). Advanced Seminar in Organizational Behavior. (1–3)

A study of special topics or problems varying from semester to semester. Examples of such seminar topics are: conflict resolution, power and influence, intergroup relations, career development and planning, and management skills.

669R. Readings in Organizational Behavior. (1–6)

A reading and discussion course with direction from a faculty member in areas of the student's interest.

672. The Consultative Process. (3)

An examination of the third-party role in group development, educational processes, conflict resolution, and organizational interventions and strategies. Class work also includes an evaluation of the ethical and skill requirements of the consultative role.

679R. Practicum in Organizational Development. (1–6)

The completion and analysis of an organizational development project under the supervision of a faculty member and a recognized professional person in an organization.

680. Organizational Behavior Research Report. (3)

Majors only.

A seminar in writing and defending a report about the student's work experience in an organization.

Philosophy

Chair: James E. Faulconer, 3196 JKHB, 378-2721

The Department of Philosophy offers a graduate minor but not a graduate major. See the BYU Undergraduate Catalog for faculty listings.

Graduate Program

Minor: Philosophy

Philosophy students study significant texts and analyze issues in diverse disciplines and in doing so gain basic habits of mind needed for mature and responsible judgment.

Program Requirements

Philosophy Minor

I. Master's level: An approved 9 hours.

- II. Doctoral level: An approved 15 hours.
- III. Students should direct inquiries about courses and advisory committee members to the department chair.

Philosophy Graduate Course

501R. Graduate Seminar. (2-5)

Prerequisite: instructor's consent.

Selected topic, figure, or movement in philosophy, as announced in current class schedule.

Physical Education

Chair: Robert K. Conlee, 221-F RB, 378-6507

Graduate Coordinator: A. Garth Fisher, 116 RB, 378-3981

Faculty/Specialties

Professors

- Allsen, Philip Edmond (1966) EdD, University of Utah, 1965. Exercise Physiology, Physical Fitness.
- Conlee, Robert K. (1977) PhD, University of Iowa, 1975. Exercise Physiology.
- Durrant, Earlene (1973) EdD, Brigham Young University, 1975. Athletic Training.
- Fisher, A. Garth (1969) PhD, University of New Mexico, 1969. Exercise Physiology.
- Harrison, Joyce M. (1969) EdD, Brigham Young University, 1973. Curriculum and Instructional Design.
- Jarman, Boyd O. (1969) EdD, University of Oregon, 1965. Administration and Supervision, Legal Liability.
- Jensen, Clayton R. (1964) EdD, Indiana University, Bloomington, 1963. Kinesiology, Measurement and Statistics, Administration.
- Lockhart, Barbara D. (1991) EdD, Brigham Young University, 1971. Administration, Ethics and Philosophy.
- McGown, Carl M. (1972) PhD, University of Oregon, 1971. Motor Learning.
- Tucker, Larry A. (1988) PhD, Southern Illinois University, 1981. Health Promotion, Research Methods.

Associate Professors

- Barker, Ruel M. (1971) EdD, Brigham Young University, 1971. Elementary Physical Education, History of Physical Education.
- Blakemore, Connie L. (1978) EdD, Temple University, 1984. Sport Pedagogy.
- Clarke, Mark S. (1982) EdD, Brigham Young University, 1971. Elementary Physical Education, Motor Development.
- Draper, David O. (1992) EdD, Northern Illinois University, 1988. Athletic Training.
- Hall, Larry Thomas (1978) PhD, University of Utah, 1976. Motor Learning.
- Leishman, Courtney M. (1962) EdD, Brigham Young University, 1976. Athletic Administration.
- Lewis, Kathryn (1972) EdD, Brigham Young University, 1978. Kinesiology, Biomechanics, Administration.
- Myrer, William (1990) PhD, Brigham Young University, 1983. Correctives and Rehabilitation.

- Silvester, L. Jay (1969) EdD, Brigham Young University, 1976. Physical Fitness and Health Promotion.
- Vickers, Betty J. (1971) EdD, Brigham Young University, 1976. History and Philosophy.

Assistant Professors

- Chamberlain, Diane (1969) EdD, University of Utah, 1984. Sociology of Sport, Elementary Physical Education.

- Schulthies, Shane S. (1991) PhD, Brigham Young University, 1991. Correctives and Rehabilitation.

Graduate Degrees and Programs

PhD Corrective Physical Education and Rehabilitation

PhD Exercise Physiology

MS, MEd Physical Education

EdD Physical Education Administration, Curriculum, and Instruction

The Department of Physical Education has the following graduate program objectives:

1. To provide a scholarly approach to physical education through careful research and rigorous intellectual inquiry.
2. To develop and train qualified professionals in physical education.
3. To develop scholars in physical education who can extend the body of knowledge.

Degree and Program Requirements

Note: (1) With the exception of PE 468 in some programs, undergraduate physical education credit may *not* apply toward a graduate degree. *Neither* do workshops nor coaching clinics apply. (2) Students planning to pursue the EdD or PhD degree in the Department of Physical Education at BYU must earn at least one of the prerequisite degrees at another university.

MS Physical Education

Candidates who have a scholarly interest in the scientific or historical aspects of physical education are encouraged to pursue this degree.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall — March 1 (U.S. and international)
 - B. Entrance examination: GRE General Test
 - C. GPA: Minimum of 3.0 for last 60 hours of undergraduate work.
- D. Statement of intent that includes the following:
 1. Applicant's preparation and background for the program.
 2. Special emphasis applicant desires to pursue.
 3. Basic reasons for applicant's career choice.
 4. Applicant's special qualities and talents that would enhance success.
 5. Professional goals.
 6. Particular reasons for applying to BYU.
 7. Specific duration for accomplishing graduate degree.
 8. Any specific circumstances or objectives applicant wishes to be considered (optional).

- II. Prerequisite: (see prerequisites with each specialization).

Requirements for Degree

1. Credit hours (30–31): Minimum 24–25 course work hours, plus 6 thesis hours (PE 699R) within areas of specialization shown below.
- II. Core courses (12 hours) for all areas of specialization: PE 630, 631, 691, 699R (Thesis: 6 hours).
- III. Areas of specialization:
 - A. Physical Education:
 1. Prerequisite: A baccalaureate degree in physical education or a baccalaureate degree in a related field and completion of the following courses or equivalent: PE 350, 361, 362, 363, 367.
 2. Core courses (12 hours): PE 630, 631, 691, 699R (thesis: 6 hours).
 3. Required courses for physical education specialization (11–12 hours): PE 654 or 655; 656 or 657; 659, 662, 666.
 4. Electives (7 hours): Select one of the following three sets of courses and one additional graduate course in physical education or a related field:
 - a. Pedagogy: PE 649, 658.
 - b. Administration: PE 651, 652.
 - c. Exercise science: PE 663, 667, 669.
 - B. Health Promotion:
 1. Prerequisite: A baccalaureate degree in physical education or a baccalaureate degree in a related field and completion of the following courses or equivalent: PE 350, 361, 362, 363, 367. In addition, for the health promotion specialization, the following undergraduate courses (or equivalent) must be completed before commencing the MS degree: PE 451, 468.
 2. Core courses (12 hours): PE 630, 631, 691, 699R (thesis: 6 hours).
 3. Required courses for health promotion specialization (18–19 hours): PE 599R (4 hours); 661, 666, 667, 669; Hlth 665; one of the following courses: PMgt 643, 649R (Seminar in Human Resource Management), 649R (Personnel Law).
 4. Electives: None.
 - C. Exercise Physiology:
 1. Prerequisite: A baccalaureate degree in physical education or a baccalaureate degree in a related field and completion of the following courses or equivalent: PE 350, 361, 362, 363, 367. In addition, for the exercise physiology specialization, the following undergraduate courses (or equivalent) must be completed before commencing the MS degree: college physics; Math 110; Chem 481; Zool 460; PE 468, 469.
 2. Core courses (12 hours): PE 630, 631, 691, 699R (thesis: 6 hours).
 3. Required courses for exercise physiology specialization (12 hours): PE 666, 667, 669, Zool 565, 566.

4. Electives: select 6 hours from the following: Chem 584; Zool 526; PE 659 or 662; 693R (1 hour); 766, 769.

D. Athletic Training:

1. Prerequisite: A baccalaureate degree in physical education and NATA certification or a baccalaureate degree in a related field and completion of the following courses or equivalent: PE 320, 321, 350, 361, 362, 363, 367, 425, 426, plus NATA certification. If the student is *not* NATA certified, then the MS degree with specialization in athletic training and NATA certification can be earned by completing the prerequisites above, plus PE 620 and 5 additional hours of PE 629R (6 hours total), in addition to the following courses:
2. Core courses (12 hours): PE 630, 631, 691, 699R (thesis: 6 hours).
3. Required courses for athletic training specialization (19 hours): PE 560, 620, 621, 622, 629R (1 hour), 666, 667, 693R (2 hours), Zool 560.
4. Electives: None.

IV. Minor: None required.

V. Thesis.

VI. Examination: Oral defense of thesis.

MEd Physical Education

The MEd degree is a 36-hour course work program designed specifically for teachers and coaches who do not wish to engage in a research study as part of the master's degree program.

The MEd degree program is generally considered to be a terminal degree. A student completing this degree who wishes to pursue a doctorate will be required to write a thesis before writing a dissertation.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —March 1 (U.S. and international)
 - B. Entrance examination: GRE General Test.
 - C. GPA: Minimum of 3.0 for last 60 semester hours of course work.
- D. Statement of intent that includes the following:
 1. Applicant's preparation and background for the program.
 2. Basic reasons for applicant's career choice.
 3. Applicant's special qualities and talents that would enhance success.
 4. Professional goals.
 5. Particular reasons for applying to BYU.
 6. Specific duration for accomplishing graduate degree.
 7. Any specific circumstances or objectives applicant wishes to be considered (optional).
- II. Prerequisite:
 - A. Baccalaureate degree in physical education or a related field, including courses in motor learning, kinesiology, exercise physiology, and corrective physical education or athletic training.

- B. Demonstrated competence in writing, fitness, sport and/or dance skills, and computer use.

Requirements for Degree

- I. Credit hours: Minimum 36 course work hours.
- II. Required courses: PE 468, 630, 631, 649, 650, 651, 652, 654, 655, 656, 657, 658, 659, 662, 691.
- III. Electives: 1–3 hours.
- IV. Minor: None required.
- V. Examination: Comprehensive examination.

EdD Physical Education Administration, Curriculum, and Instruction

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall —March 1 (U.S. and international)
 - B. Entrance examination: GRE General Test.
 - C. GPA: Minimum of 3.5 for last 60 hours of course work.
 - D. Statement of intent that includes the following:
 - 1. Applicant's preparation and background for the program.
 - 2. Special emphasis applicant desires to pursue.
 - 3. Basic reasons for applicant's career choice.
 - 4. Applicant's special qualities and talents that would enhance success.
 - 5. Professional goals.
 - 6. Particular reasons for applying to BYU.
 - 7. Specific duration for accomplishing graduate degree.
 - 8. Any specific circumstances or objectives applicant wishes to be considered (optional).
- II. Prerequisite:
 - A. Master's degree in physical education or equivalent.
 - B. Demonstrated competence in writing, speaking, fitness, sport and/or dance skills, and computer use.
 - C. Two years of successful professional experience.
 - D. PE 797R for candidates who have not written a thesis. These candidates must produce a publishable research manuscript before beginning work on a dissertation. (This is prerequisite and will not count toward the 85 hours.)

Requirements for Degree

- I. Credit hours: Minimum 85 hours beyond baccalaureate degree (at least 37 of which must be at BYU), including 12 dissertation hours (799R).
- II. Required core courses: PE 630, 654, 655, 656, 657, 659, 662, 691; Stat 501, 502; computer literacy.
- III. Required courses: PE 649, 650, 651, 652, 658, 751R, 755; EPsy 620 or EPsy 601; 19–22 hours of supporting course work (12 hours must be outside the Department of Physical Education). A majority of the work must be taken at BYU.
- IV. Minor (optional): Organizational behavior or instructional science.
- V. Dissertation.
- VI. Examinations:
 - A. Comprehensive examination.

- B. Oral defense of dissertation.

PhD Corrective Physical Education and Rehabilitation PhD Exercise Physiology

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall —March 1 (U.S. and international)
 - B. Entrance examination: GRE General Test.
 - C. GPA: Minimum of 3.5 for last 60 hours.
 - D. Statement of intent: See description under (EdD).
- II. Prerequisite:
 - A. Baccalaureate degree in physical education or related field, with competence equivalent to the following:
 - 1. Historical, philosophical, and sociological foundations of physical education (PE 350).
 - 2. Measurement and evaluation (PE 360).
 - 3. Motor learning (PE 361).
 - 4. Kinesiology and biomechanics (PE 362).
 - 5. Physiology of activity (PE 363).
 - 6. Adaptive and corrective physical education (PE 460).
 - 7. Problems in conditioning (PE 468).
 - B. Completion of courses in the foundational sciences equivalent to the following:
 - 1. For corrective emphasis:
 - a. Anatomy and upper-division physiology (Zool 260, 460).
 - b. College physics (Phscs 105, 106).
 - c. College mathematics through trigonometry (Math 110, 111).
 - d. College chemistry (Chem 105, 106, 107).
 - e. Abnormal psychology (Psych 342).
 - f. Food science and nutrition (FSN 435).
 - g. Histology (Zool 380) required for animal research.
 - 2. For exercise physiology emphasis:
 - a. Anatomy and upper-division physiology (Zool 260, 460).
 - b. College physics (Phscs 105, 106).
 - c. College chemistry through biochemistry (Chem 105, 106, 107, 351, 352, 353, 481).
 - d. College mathematics through calculus (Math 110, 119)
 - C. PE 797R for candidates who have not written a thesis. These candidates must produce a publishable research manuscript before beginning work on a dissertation. (This is prerequisite and will not count toward the 78 hours.)
- III. Requirements for Degree
 - I. Credit hours (78): Minimum of 60 course work hours beyond baccalaureate degree, plus 18 dissertation hours (PE 799R) and the skill requirement. Required core courses:
 - A. Exercise physiology: PE 469 (or Zool 560), 630, 659, 662, 666, 667, 669, 691, 693R, 766, 769.
 - B. Corrective : PE 464 (or Zool 560), 560, 599R or 629R, 621, 622, 630, 666, 667, 669, 691.
 - II. Supporting field: 20 hours required.

- A. Exercise physiology: Chem 584; Zool 565, 566, 662R; 11 additional approved hours.
- B. Corrective : 20 hours from Psych 585, Zool 560, 584, FSN 531, 532, 631R, OrgB 540, 614, 630, 640, 670, MBA 541.
- III. Electives: Choose from graduate courses in physical education and related fields.
- IV. Minor (optional): Approved minors related to field of emphasis.
- V. Skill requirement: Consult department.
- VI. Dissertation.
- VII. Examinations:
 - A. Comprehensive examination.
 - B. Oral defense of dissertation.

Program and Degree Resources

- 1. Anatomy: Five cadavers and skeletons.
- 2. Biomechanics: Video replay analysis, force test table with cable tensiometers, Cybex II, digitizer and IBM computer, high-speed cinematographic equipment, Ariel systems movement analysis equipment.
- 3. Exercise biochemistry: Biochemical analysis, muscle histology, and muscle biopsy equipment and facilities.
- 4. Human performance: Treadmills, bicycle ergometers, hydrostatic weighing facility, breath-by-breath VO₂ analysis system, EKG units, and Cybex.
- 5. Small animal facility: 200 animal cages, rodent treadmill, tissue traumatizer, and separation force instrument.
- 6. Athletic training: Two large, well-equipped facilities plus three satellite training rooms located in the Marriott Center and football stadium.
- 7. Motor learning: Basic equipment used for laboratory associated with motor learning classes. Devices for measuring learning, speed of movement, and reaction time.

Physical Education Graduate Courses

550. Motor Development and Growth of Children. (2)
Existing body of knowledge regarding motor development of children and significance of physical activity in early childhood.

560. Advanced Corrective Physical Education. (2)
Prerequisite: PE 460.

Techniques of postural evaluation, muscle testing, therapeutic exercises, and relaxation; extent and limitations of the physical educator's responsibility for recognizing divergent conditions; referral procedures.

582. Physical Education for the Mentally Retarded. (2)
Prerequisite: baccalaureate degree in physical education.

Theoretical and practical aspects of teaching the mentally retarded child and adult.

586R. Workshop in Fitness and Sport. (1-4)
Prerequisite: undergraduate major in physical education or equivalent.

599R. Practicum. (1-9)

Prerequisite: PE 468 or concurrent registration for conditioning coaches.

Field experience for physical education students; fifty hours of volunteer service in approved organization required per credit hour.

620. Advanced Athletic Training. (3)

Prerequisite: PE 320, 420.

Advanced theory and practical skills in prevention, immediate care, and treatment of injuries.

621. Physical Examination and Rehabilitation of Athletic Injuries. (2)

Prerequisite: PE 320, 363, 420, 460, 560, 620.

For athletic training students. Specific rehabilitation programs for specific injuries; examining the injury.

622. Therapeutic Modalities in the Treatment of Athletic Injuries. (2)

Prerequisite: PE 320, 363, 420, 620.

For athletic training students. Hydrotherapy, massage, traction, radiant energy, heat, cold, and electrotherapy.

629R. Athletic Training Practicum. (1-6)

Prerequisite: PE 320, 420, 620, and advisor's consent.

Academic and practical application of athletic training skills in the training room setting.

630. Research Methods in Physical Education. (3)

Prerequisite: PE 360 or equivalent.

Understanding, designing, and conducting research; writing for publication in physical education.

631. Research Design in Physical Education. (2)

Prerequisite: PE 360 or equivalent; PE 630.

Designing, conducting, and analyzing data for experimental and survey research studies in physical education using standard statistical procedures.

649. Curriculum Theory and Design in Physical Education. (3)

Theoretical and practical aspects of curriculum design in physical education.

650. Measurement and Evaluation in Physical Education. (2)

Prerequisite: PE 631 or Stat 501, or concurrent registration.

Instruments and procedures for psychomotor, fitness, cognitive, and affective assessment in physical education.

651. Personnel Management and Supervision in Physical Education. (3)

Theory and practice of successful personnel management and supervision in physical education.

652. Administration of Physical Education and Athletic Programs. (3)

Administration and management of physical education, athletics, and related programs and the role of public relations in these programs.

654. History of Physical Education. (3)

Review and analysis of historical facts and events in physical education and sports.

655. Philosophy: Ethics and Issues. (2)

Ethical and moral interpretations and concepts underlying the profession.

656. Psychological Implications of Sport. (2)

Prerequisite: graduate standing; Psych 111, PE 450, or equivalent.

Review of the psychological phenomena inherent in sport as they relate to the teacher/coach, participant, and spectator.

657. Sport and Society. (2)

Prerequisite: PE 450 or equivalent.

Relationship of sport to other elements of society, emphasizing the twentieth century.

658. Learning Theory, Sport Pedagogy, and Instructional Design in Physical Education. (3)

Prerequisite: PE 659.

Systematic approach to designing and evaluating cognitive, psychomotor, and affective instruction in physical education.

659. Theory of Motor Learning. (2)

Prerequisite: PE 361.

Theories and methods of learning physical skills.

661. Fitness and Wellness in the Workplace. (3)

Management for effectively designing, marketing, implementing, and administering health promotion programs.

662. Mechanical Analysis of Activities. (2)

Prerequisite: PE 362.

Analysis of movement mechanics in sport, dance, and athletic activities to identify how to achieve the highest degree of skill possible in each activity.

663. Research Techniques in Biomechanics of Sport. (2)

Prerequisite: PE 362, 662.

Theory and practice of research techniques in biomechanics: statics, dynamics, body segment parameters, photoinstrumentation, electronic instrumentation, digital computer techniques, literature sources, and laboratory fundamentals.

666. Exercise Physiology. (3)

Prerequisite: PE 363.

Adjustments made by the body to accommodate physical activity.

667. Laboratory Methods and Procedures. (2)

Prerequisite: PE 363; 666 or concurrent registration.

Basic techniques and procedures used in human performance laboratories.

669. Exercise, Testing, and Prescription in Coronary Heart Disease. (2)

Prerequisite: PE 666, 667.

In-depth study of coronary heart disease: risk factors, symptoms, and interventions; role of exercise in testing, prescription, and rehabilitation.

685. Physical Education in the Elementary School. (2)

For teachers, administrators, and supervisors. Curricular interrelationships and content materials directed toward obtaining educational results.

691. Seminar. (1)

Prerequisite: acceptance into graduate program.

Orientation of students to physical education. Evaluation of students' aptitudes, leadership qualities, and ability to successfully complete a graduate program.

693R. Graduate Seminar in Readings. (1)

Prerequisite: PE 666 or concurrent registration for exercise physiology section.

Weekly seminar covering selected topics in physical education. Doctoral students in exercise physiology should enroll each semester.

699R. Master's Thesis. (1-9)**751R. Doctoral Seminar. (2)**

Prerequisite: registration in EdD or PhD program. EdD students must enroll for four consecutive semesters.

Selected topics for university professors, administrators, and consultants. Topics rotate each semester: teaching physical education or athletic training in higher education; research and publication; program coordination, advisement, and supervision; grantsmanship.

755. Research on Teaching and Teacher Evaluation in Physical Education. (2)

Prerequisite: PE 659.

Review of research on teaching and teacher evaluation affecting teaching and administration of physical education.

766. Advanced Exercise Physiology: Cardiopulmonary. (3)

Prerequisite: PE 666, 667.

Cardiovascular and pulmonary systems and how they meet the metabolic needs of muscles during exercise.

769. Advanced Exercise Physiology: Skeletal Muscle. (3)

Prerequisite: PE 666, Chem 481.

Effects of acute and chronic exercise on anatomy, physiology, and biochemistry of skeletal muscle.

797R. Individual Research and Study in Physical Education. (2-9)

Prerequisite: undergraduate major in physical education; matriculation for graduate study in the department.

799R. Doctoral Dissertation. (1-18)**Physics and Astronomy**

Chair: Daniel L. Decker, 296 ESC, 378-4361

Graduate Coordinator: Dorian M. Hatch, 175 ESC, 378-2427

Faculty/Specialties**Professors**

Allred, David D. (1987) PhD, Princeton University, 1977.
Lasers, X Rays, Surface Physics.

Ballif, Jae R. (1962) PhD, University of California, Los Angeles, 1962. Space Physics.

Barnett, J. Dean (1958) PhD, University of Utah, 1959.
Solid-State Physics.

Decker, Daniel L. (1958) PhD, University of Illinois, 1958.
Solid-State Physics.

Dibble, William E. (1961) PhD, California Institute of Technology, 1960. X Rays.

- Evenson, William E. (1970) PhD, Iowa State University of Science and Technology, 1965. Theoretical Solid-State Physics.
- Harrison, B. Kent (1964) PhD, Princeton University, 1959. General Relativity.
- Hatch, Dorian M. (1968) PhD, State University of New York, 1968. Theoretical Solid-State Physics, Group Theory.
- Jensen, Gary Lee (1966) PhD, University of Michigan, 1964. Nuclear Physics.
- Jones, Douglas E. (1964) PhD, Brigham Young University, 1964. Space Physics.
- Knight, Larry V. (1973) PhD, Stanford University, 1965. Lasers, X Rays.
- Larson, Everett Gerald (1964) PhD, Massachusetts Institute of Technology, 1964. Theoretical Atomic Physics.
- Mason, Grant W. (1970) PhD, University of Utah, 1969. Plasma Physics.
- McNamara, D. Harold (1955) PhD, University of California, Berkeley, 1950. Astrophysics.
- Merrill, John J. (1971) PhD, California Institute of Technology, 1960. Instructional Design.
- Nelson, H. Mark (1959) PhD, Harvard University, 1960. Solid-State Physics.
- Rasband, S. Neil (1972) PhD, University of Utah, 1969. Theoretical Plasma Physics.
- Stokes, Harold T. (1981) PhD, University of Utah, 1977. Solid-State Physics.
- Strong, William J. (1967) PhD, Massachusetts Institute of Technology, 1964. Acoustics.
- Vanfleet, Howard B. (1960) PhD, University of Utah, 1961. Solid-State Physics.

Associate Professors

- Christensen, Clark G. (1972) PhD, California Institute of Technology, 1972. Astrophysics.
- Hart, Grant W. (1985) PhD, University of Maryland, 1983. Plasma Physics.
- Jones, Steven E. (1985) PhD, Vanderbilt University, 1978. Muon Catalyzed Fusion
- Rees, Lawrence B. (1986) PhD, University of Maryland, 1983. Nuclear Physics.
- Spencer, Ross L. (1984) PhD, University of Wisconsin, 1979. Theoretical Plasma Physics.
- Taylor, Benjamin J. (1980) PhD, University of California, Berkeley, 1969. Astrophysics.

Assistant Professors

- Moody, Joseph Ward (1990) PhD, University of Michigan, 1986. Astrophysics.
- Van Huele, Jean-Francois (1988) PhD, Brussels Free University, Belgium, 1987. Theoretical Physics.

Graduate Degrees and Programs

- MS, PhD Physics
PhD Physics and Astronomy

Financial Aid

Qualified graduate students receive financial aid that may take the form of one or more of the following: teaching assistantships, research assistantships, scholarships (including the John Einar Anderson Scholarship), internships (university-sponsored fellowships), or tuition

awards. The amount of financial aid given depends on individual merit.

Degree and Program Requirements

MS Physics

The master of science degree is sometimes sought by those who intend to continue on for the PhD, but more often it serves as a terminal degree for those who intend to work in industrial or governmental research or teaching.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
 - B. Entrance examinations: GRE advanced physics subject test.
- II. Prerequisite: Baccalaureate degree in physics or equivalent. Appropriate course work will be suggested by graduate advisor for removing deficiencies in undergraduate study.

Requirements for Degree

- I. Credit hours (30): Minimum 24 approved course work hours including 18 hours of nonrepeatable graduate courses (a repeatable course is one whose number ends in R), plus 6 thesis hours (Phscs 699R).
- II. Before admission to candidacy, a student must be accepted as a research student by a member of the faculty of the Department of Physics and Astronomy and submit a proposed study list. The study list is normally completed by the beginning of the second semester of graduate study.
- III. Required course: Phscs 591R (graduate seminar) each semester of residence.
- IV. Thesis.
- V. Examinations: Final oral examination and defense of thesis.

PhD Physics

PhD Physics and Astronomy

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
 - B. Entrance examinations: GRE advanced physics subject test.

Requirements for Degree

- I. Credit hours (66): Minimum of 48 (B- grade or better in each class) hours in approved course work exclusive of graduate seminars (see Phscs 591R); plus dissertation (18 hours minimum, Phscs 799R).
 - A. Required core courses:
 1. Phscs 591R each semester of residence.
 2. For physics degree: Phscs 517, 518, 621, 641, 642, 651, 652.
 3. For physics and astronomy degree: Phscs 517, 518, 527, 528, 621, 651, 652.

- B. Required courses in emphasis: At least 12 hours in the specialty listed below that is most closely related to the field of research to constitute a major and 12 hours in a second specialty to constitute a minor. No duplication between the courses listed below and those listed above is permitted. Students whose research is in acoustics may, with the approval of their committee, construct a 12-hour minor that includes courses outside the department.
1. Acoustics: Phscs 561, 562, 565, 566, 581, 623, 631, 681.
 2. Astrophysics: Phscs 527, 528, 529, 611, 612, 627, 628, 711R.
 3. Atomic physics: Phscs 527, 528, 571, 631, 632, 671, 711R.
 4. Nuclear physics: Phscs 631, 655, 656, 711R, 751, 752.
 5. Plasma physics: Phscs 536, 537, 545, 546, 623, 631, 632, 645, 646, 711R.
 6. Solid-state physics: Phscs 623, 631, 632, 681, 682, 711R.
 7. Theoretical physics: Phscs 617, 618, 619, 625, 626, 632, 711R, 751, 752.
 8. Planetary and space physics: Phscs 536, 537, 545, 546, 711R.
 9. Physics group for physics and astronomy degree only: Phscs 536, 537, 625, 626, 645, 646, 655, 656, 711R (6 hours); 631, 632, 641, 642 (6 hours).
- II. Before admission to candidacy, a student must be accepted as a research student by a member of the faculty of the Department of Physics and Astronomy and submit a proposed study list. The study list is to be completed by the beginning of the second semester of graduate study.
- III. Foreign language/Skill requirement: Select any one of the following four options:
- A. Option 1: Single language. Demonstrate a thorough familiarity with French, German, or Russian. An examination will test ability to (1) translate literature in the student's field and (2) communicate orally in the language. In lieu of a special examination, the student can meet this requirement by completing a minimum 22 semester hours in the language chosen with a GPA of B (3.0) or higher. In either case, the language department involved must certify competency.
 - B. Option 2: Two languages. Complete one of the following requirements for each language. Acceptable languages are French, German, and Russian.
 1. Take and pass approved intensive reading courses in the language.
 2. Complete 16 semester hours of credit with an average grade of B (3.0) in the language.
 - C. Option 3:
 1. Demonstrate competency in reading Russian, French, or German.
 2. Demonstrate competency in the use of computers as they relate to scientific computa-

- tions comparable to the completion of a 3-hour computer science course.
3. Complete satisfactorily 6 hours of course work, approved by the advisory committee and selected from:
- a. Upper-division or graduate mathematics courses (except Math 343, 344, 434).
 - b. Upper-division or graduate statistics or computer science courses emphasizing the use of statistics and computers in the physical sciences.
 - c. Phscs 617, 618.
- D. Option 4:
1. Complete requirements 2 and 3 of Option 3.
 2. Complete satisfactorily 9 more hours of course work, approved by the advisory committee and selected from the list in requirement 3 of Option 3.
- IV. Dissertation.
- V. Examinations:
- A. Comprehensive written and oral examinations when next given after completion of required courses. These are regularly scheduled early in September.
 - B. Oral examination and defense of dissertation.

Physics and Astronomy Graduate Courses

- 513R. Special Topics in Contemporary Physics.** (1-3) E, W, Sp, Su on dem.
Prerequisite: instructor's consent.
Topics generally related to recent developments in physics.
- 517, 518. Mathematical Physics.** (3 ea.) E, W
Prerequisite: Phscs 318, Math 434.
Topics in modern theoretical physics, including applications of matrix and tensor analysis and linear differential and integral operators.
- 527, 528. Introduction to Astrophysics.** (3 ea.) E, W
Prerequisite: instructor's consent.
Principles and observational techniques of astrophysics.
- 529. Observational Astrophysics.** (3) On dem.
Prerequisite: Phscs 527, 528.
Survey of important areas of current research.
- 536, 537. Space and Planetary Physics.** (3 ea.) E, W on dem.
Prerequisite: Phscs 321, 431, 442.
Solar plasmas, planetary atmospheres and interiors, comets, cosmic rays, and space measurement techniques.
- 545. Introduction to Plasma Physics.** (3) F odd yr.
Prerequisite: Phscs 321, 431, 441.
Introduction to plasma physics, including single-particle motion and both fluid and kinetic models of plasma behavior.
- 546. Plasma Transport.** (3) W odd yr.
Prerequisite: Phscs 545.
Transport processes in plasmas applied to space physics, fusion, and laser plasmas.

551, 552. Modern Physics. (3 ea.) F, W

Prerequisite: Phscs 222, 318.

Special relativity; analytical foundations of quantum mechanics; applications to atomic, molecular, statistical, solid-state, and nuclear physics; elementary particles.

561. Fundamentals of Acoustics. (3) W

Generation, transmission, and reception of sound.

Vibrating systems, properties of elastic media, mechanical and electrical energy, and radiation.

562. Acoustical Measurements. (1-3) On dem.

Prerequisite: Phscs 561 or concurrent registration.

Selected experiments in acoustics.

565. Acoustics of Music and Speech. (3) F odd yr.

Prerequisite: Phscs 561 or instructor's consent.

Sound production and perception, techniques for analysis and synthesis, computer modeling, machine recognition, and ensemble effects.

566. Architectural Acoustics and Noise. (3) F even yr.

Prerequisite: Phscs 561 or instructor's consent.

Computer modeling of enclosures, techniques for measuring noise spectra, room design, noise control.

571. Laser Physics. (3) On dem.

Prerequisite: Phscs 222, Math 344; basic understanding of atomic physics and optics.

Physics of coherent radiation throughout the electromagnetic spectrum, including amplification and laser cavities. Discussion based on quantum mechanical principles, but mathematical treatment classical.

581. Solid-State Physics. (3) W

Prerequisite: Phscs 222.

Introduction for students in physics, chemistry, geology, and engineering. Phenomena occurring in solids, and their related physical concepts.

591R. Colloquium. (0.5) F, W

Required of all graduate students every semester in residence.

597R. Introduction to Research. (0.5) F, W

One or two research areas to be selected. Twenty hours of participation required each semester.

611, 612. Astrophysics. (3 ea.) On dem.

Prerequisite: instructor's consent.

Theory of stellar atmospheres and interstellar matter.

617. Advanced Topics in Theoretical Physics. (3) On dem.

Applications of tensor analysis, differential geometry, and differential forms to such topics as mechanics, optics, relativity, and fluid dynamics.

618. Advanced Topics in Theoretical Physics. (3) F odd yr.

Introductory group theory. Basic representation theory and developments, with applications to quantum mechanics and molecular and solid-state physics.

619. Advanced Topics in Theoretical Physics. (3) W odd yr.

Prerequisite: Phscs 618.

Advanced group theory. Space groups and lie groups with applications in solid-state physics (energy band representations, phase transitions, etc.), nuclear physics, and quantum field theory (particle classification schemes, etc.).

621. Dynamics. (3) F

Prerequisite: Phscs 321.

Advanced treatment of classical mechanics, including Lagrange's and Hamilton's equations, rigid body motion, and canonical transformations.

623. Dynamics of Continuous Media. (3) W odd yr.

Prerequisite: Phscs 621.

Mechanics of systems with an infinite number of degrees of freedom. Topics include elasticity and hydrodynamics.

625. Theory of Relativity. (3) On dem.

Prerequisite: Phscs 551, 621.

Review of special relativity and general relativity, with applications to modern astrophysics.

626. Relativistic Astrophysics. (3) On dem.

Prerequisite: Phscs 625.

Applications of general relativity to modern astrophysics, including gravitational collapse, black holes, cosmological models, gravitational waves, etc.

627, 628. Advanced Topics in Astrophysics. (3 ea.) F, W on dem.

Prerequisite: instructor's consent.

Internal structure of stars; galactic structure.

631, 632. Statistical Mechanics. (3 ea.) F, W even yr.

Prerequisite: Phscs 431, 551.

Advanced thermodynamics, classical statistical mechanics, quantum statistics, and transport theory.

636. Solar System Magneto-Plasma Interactions. (3)

On dem.

Prerequisite: Phscs 536, 537.

Interactions of plasmas with atmospheres and surfaces of solar system objects such as planets, comets, and moons.

641, 642. Mathematical Theory of Electricity and Magnetism. (3 ea.) F, W

Prerequisite: Phscs 442.

Advanced electrostatics and magnetostatics, Maxwell's equations and electromagnetic waves, relativistic electrodynamics, radiation theory, and interaction of matter with electromagnetic fields.

645, 646. Plasma Physics. (3 ea.) F, W even yr.

Prerequisite: Phscs 431, 621, 642 for 645; Phscs 645 for 646.

Plasma state of matter, including a description in terms of both individual particles and fluids, with applications.

651, 652. Quantum Mechanics. (3 ea.) F, W

Prerequisite: Phscs 518, 551.

Nonrelativistic quantum mechanics, with applications.

655, 656. Nuclear Physics. (3 ea.) F, W odd yr.

Prerequisite: Phscs 552.

Fundamental properties of nuclei, nuclear forces, nuclear models, electromagnetic properties of nuclei, particle radioactivity, nuclear reactions, and interaction of radiation with matter.

671. X-Ray Physics. (3) On dem.

Prerequisite: Phscs 518, 552, 581.

Physical characteristics of X-ray generation, optics, and experimental applications. Methods of X-ray imaging emphasized.

681, 682. Modern Theory of Solids. (3 ea.) F, W odd yr.
Prerequisite: Phscs 481, 651.

Quantum theory of solids, emphasizing the unifying principles of symmetry, energy-band theory, dynamics of electrons and of periodic lattices, and cooperative phenomena.

697R. Research. (1–6) F, W, Sp, Su

699R. Master's Thesis. (1–9) F, W, Sp, Su

711R. Advanced Topics in Physics. (1–3) On dem.
Prerequisite: instructor's consent.

Recent and upcoming topics include chaos, thin films, phase transformations, amorphous solids, astronomy using nontraditional frequencies, and particle physics.

751, 752. Advanced Quantum Theory. (3 ea.) F, W even yr.

Prerequisite: Phscs 652.

Topics in relativistic quantum mechanics, including quantum field theory.

797R. Research. (1–9) F, W, Sp, Su

799R. Doctoral Dissertation. (1–9) F, W, Sp, Su

Political Science

Chair: David B. Magleby, 722 SWKT, 378-3423

Graduate Program and Degree

MA Political Science

The Department of Political Science currently offers only a joint BA/MA degree with an emphasis in public policy analysis. Undergraduate students interested in this program should consult with the department or refer to the BYU Undergraduate Catalog.

Psychology

Chair: David V. Stimpson, 1001 SWKT, 378-4287

Graduate Coordinator: Kay H. Smith, 1094 SWKT, 378-6359

Faculty/Specialties

Professors

Bednar, Richard L. (1982) PhD, University of Minnesota, 1968. Theories of Group Work, Psychotherapy, Psychopathology, Personality, Self-esteem.

Bennion, Robert C. (1961) PhD, Ohio State University, 1961. Social Learning and Personal Construct Theories.

Bergin, Allen E. (1972) PhD, Stanford University, 1960. Psychology and Religion, Personality Theory, Psychotherapy Research.

Bigler, Erin D. (1990) PhD, Brigham Young University, 1974. Neuropsychology, Neuroanatomy, Neuroimaging.

Brown, Bruce L. (1968) PhD, McGill University, Montreal, 1969. Psycholinguistics, Statistics and Research Methods.

Bunker, Gary L. (1970) PhD, University of California, Berkeley, 1966. Prejudice and Intergroup Relations.

Cundick, Bert P. (1962) PhD, Ohio State University, 1962. Child Development and Assessment.

Fleming, Donovan E. (1971) PhD, Washington State University, 1962. Developmental Psychobiology, Neurophysiology, Sensory and Perceptual Processes.

Fuhriman, Addie (1992) PhD, University of Minnesota, 1969. Individual and Group Psychotherapy, Group Therapy Processes and Outcomes.

Higbee, Kenneth L. (1970) PhD, Purdue University, 1970. Cognitive Psychology with a Focus on Learning and Memory, Research Methodology.

Howell, Robert J. (1952) PhD, University of Utah, 1951. Psychopathology, Forensic Psychology.

Jensen, Larry C. (1965) PhD, Michigan State University, 1966. Moral Development, Parenting, Gender Issues, Adolescence, Social Policy Analysis, Theory.

Lambert, Michael J. (1971) PhD, University of Utah, 1971. Research in Psychotherapy Process and Outcome, Sport Psychology.

Miller, Harold L., Jr. (1975) PhD, Harvard University, 1975. Experimental Analysis of Learning and Motivation.

Pedersen, Darhl M. (1962) PhD, University of Illinois, 1962. Quantitative Methods, Personality, Environmental Psychology.

Robinson, Paul W. (1969) PhD, Utah State University, 1973. Behavior Modification, Analytical Methodology.

Smith, Kay H. (1961) PhD, Wayne State University, 1962. Group Dynamics and Assessment of Interpersonal Skills.

Sorenson, David M. (1969) EdD, Harvard University, 1970. Psychodiagnostics, Human Development.

Stimpson, David V. (1964) PhD, University of California, Berkeley, 1964. Attitude Formation and Change, Small Group Processes, Leadership and Management, Entrepreneurship.

Weight, David G. (1969) PhD, University of Washington, 1969. Psychopathology, Assessment, Neuropsychology.

Associate Professors

Barlow, Sally H. (1978) PhD, University of Utah, 1978. Theory and Training in Individual and Group Therapy, Race and Gender Diversity, Advanced Objective Assessment.

Bloch, George J. (1989) PhD, Stanford University, 1968. Physiological Psychology, Neuroendocrinology.

Burlingame, Gary M. (1983) PhD, University of Utah, 1983. Short-Term Individual and Group Therapy, Research Design, Psychometrics.

Wells, Marion Gawain (1972) PhD, Purdue University, 1972. Psychotherapy, Clinical Child Psychology, Child and Adolescent Assessment.

Williams, Richard N. (1981) PhD, Purdue University, 1981. Theoretical and Philosophical Foundations of Social Psychology.

Wood, Larry Eugene (1977) PhD, University of Iowa, 1971. Cognitive Psychology, Applications of Artificial Intelligence.

Assistant Professors

- Clayton, Claudia J. (1991) PhD, Brigham Young University, 1991; PhD, University of Utah, 1976; Biological Psychology, Treatment of Personality Disorders.
- Maughan, Michael L. (1972) EdD, Utah State University, 1970. Psychotherapy, Adult Development, Biofeedback, Stress Management.
- Orme, G. Craig (1983) PhD, Utah State University, 1980. Clinical Application, Behavioral Medicine/Health Psychology, Crisis Intervention.
- Ridge, Robert D. (1992) PhD, University of Minnesota, 1993. Attitudes, Personality, Social Behavior, Research Methods and Design.

Graduate Degrees and Programs

PhD Clinical Psychology

MS PhD Psychology

Degree and Program Requirements

MS Psychology

The master's degree in psychology provides advanced education in preparation for application to doctoral programs: community college, junior college, or high school teaching; and general strengthening of expertise in psychology. It is not intended as a terminal professional degree.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall —January 31 (U.S. and international)
 - B. Entrance examination: GRE General Test.
 - C. GPA: Minimum 3.0 for the last 60 hours.
- II. Prerequisite:
 - A. Baccalaureate degree in psychology (other fields will be considered).
 - B. Undergraduate major in psychology desirable. Previous course work should include general psychology, elementary psychological statistics, experimental psychology, and three additional psychology courses.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (699R).
- II. Required courses: Psych 501, 502 (first two semesters in residence) and three of 510, 520, 540, 550, 560, 565, 575, 583.
- III. By the end of the first semester students must select their advisory committee, submit their study list, and schedule their thesis prospectus review.
- IV. Electives: Determined in consultation with advisory committee.
- V. Thesis.
- VI. Examination: Final oral examination on course work and defense of thesis.

School Psychology

The school psychology program is a cooperative program between the Departments of Psychology and Edu-

cational Psychology. The program is administered through Educational Psychology, and appropriate degrees and certificates are awarded through the College of Education. For further information regarding this program, see the description given in the Educational Psychology section of this catalog.

PhD Clinical Psychology

The clinical psychology training program at Brigham Young University is accredited by the American Psychological Association and leads to the PhD degree. This program is ordinarily completed in five years, including a one-year, full-time internship completed in an accredited agency away from the university. Candidates with varied backgrounds who have strong academic and clinical promise are recruited.

The philosophy of the clinical training program adheres to the scientist-practitioner model. Training focuses on academic and research competence as well as concentrating on the theory and practicum experiences necessary to develop strong clinical skills.

The program at Brigham Young University is eclectic in its theoretical approach, drawing from a wide range of theories and orientations in an attempt to give broad exposure to a diversity of traditional and innovative approaches. All students receive a basic core of training in adult clinical psychology. They may also elect to take a special emphasis in: (1) child, adolescent, and family; (2) clinical neuropsychology; (3) clinical research, or (4) values, religion, and mental health.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines: Fall —January 31 (U.S. and international)
 - B. Entrance examination: GRE General Test.
- II. Prerequisite: Course work in introductory, experimental, and abnormal psychology; statistics; personality; learning or cognition; and tests and measurements.

Requirements for Degree

- I. Credit hours (121 minimum).
- II. Skill requirements:
 - A. Undergraduate statistics (3 hours).
 - B. Undergraduate research design and analysis (3 hours).
 - C. Research methodology: Psych 500R—Measurement, Psych 500R—Design, Psych 500R—Clinical Research (9 hours).
 - D. Graduate statistics: Psych 501 or Stat 501, Psych 502 or Stat 502 (10 hours).
- III. General core courses (B grade or better except in Psych 645, 657R):
 - A. Biological bases of behavior: Psych 583 or 585; 687R (6 hours).
 - B. Social bases of behavior: Psych 555 (3 hours).
 - C. Cognitive-affective bases of behavior: Psych 560 or 575 (3 hours).
 - D. Individual differences: Psych 520, 645 (6 hours).
 - E. History and systems: Psych 510 (3 hours).
 - F. Ethics and standards: Psych 609 (3 hours).

IV. Clinical courses:

- A. Assessment: Psych 622, 623, 624 (9 hours).
- B. Psychotherapy: Psych 651, 652, 653 (9 hours).
- C. Personality and psychopathology: Psych 611, 675 (7 hours).
- D. Practicums, clerkships, and case conferences: Psych 740R, 741R, 743R (29 hours minimum).
- E. Internship: Psych 745, 746, 747, 748 (6 hours).
- F. Dissertation: Psych 799R (18 hours).
- V. Emphasis sequences: A sequence of elective courses may be taken in the following emphasis areas:
 - A. Child, adolescent.
 - B. Clinical neuropsychology.
 - C. Clinical research.
 - D. Values, religion, and mental health.
- VI. Dissertation (including a journal article in a form acceptable for submission appended to the dissertation) to be completed before internship.
- VII. Internship: One-year internship in a setting approved by the clinical director. Before going on internship, students complete all other requirements.
- VIII. Examinations:
 - A. Comprehensive examinations are taken in the first, second, and third years.
 - B. Oral defense of dissertation.

For additional information about the program, write or call the secretary or the director of Clinical Training, 284 TLRB, Brigham Young University, Provo, UT 84602, (801) 378-4050.

PhD Psychology

The doctoral program in psychology offers rigorous educational experience leading to the PhD degree. The first three semesters of the program are designed to provide broad coverage of the substantive areas of the field, training in research skills, and introduction to the particular areas of emphasis offered in the program. During the last two years of the program students will pursue specialized course work and training in one of five emphasis areas: (1) applied social psychology, (2) behavioral neurobiology, (3) instructional psychology, (4) learning and cognition, and (5) theoretical/philosophical psychology.

The course work for these emphasis areas will be outlined under the supervision of the student's advisory committee.

During the first year students should select a faculty advisor and an advisory committee. All students will complete a common core of course work during the first three semesters. By the end of the second year in the program, all students will complete an MS degree, including a thesis. Following the completion of these requirements, students will concentrate on course work and research in the emphasis area they wish to pursue under the direction of the advisory committee.

Admission and Entry**I. Application Requirements:**

- A. Semesters of entry and application deadlines:
Fall —January 31 (U.S. and international)
- B. Entrance examination: GRE General Test.

Requirements for the Degree

- I. Credit hours (63 plus skill): Minimum 45 course work hours plus 18 dissertation hours (799R) and skill requirement hours.
- II. Required core courses: B grade or better in Psych 501, 502, 510, 540, 550, 560, 575, 583, 600R, 605, 606, 607.
- III. Skill requirement: This requirement will be met by completing course work in the areas of mathematics, statistics, or computer science as approved by advisory committee to total 18 hours minimum. If Psych 501 and 502 are used toward completion of this requirement, they may not double count toward the core hour requirement.
- IV. Other program requirements:
 - A. All students will be required to complete a master's thesis by the end of their second year in the program.
 - B. Examinations: By the end of their third year in the program (August), all students will complete and obtain approval on a major literature review in the emphasis area of their choice. This project should constitute a contribution to the field and demonstrate mastery of a body of research literature.
 - C. Dissertation: By the end of their fourth year in the program students should complete and defend a dissertation in their chosen emphasis area (including a journal article in a form acceptable for submission appended to the dissertation, unless exempted in individual cases by the dissertation committee and the program chair).
- V. Sequence of program requirements:
 - A. **First year:** Fall, Psych 501, 550, 560, 605. Winter, Psych 502, 540, 583, 606.
 - B. **Second year:** Fall, Psych 575, 600R, 607. By the end of the second year students should have completed and defended a master's thesis.
 - C. **Third year:** Students specialize in an emphasis area (or emphasis areas), take course work selected in consultation with their advisory committee, complete skill requirements, and complete the specialty literature review project.
 - D. **Fourth year:** This year is devoted to finishing course work and training in an emphasis area and to completing the dissertation. Students must complete 18 hours of dissertation credit (Psych 799R) as part of the dissertation requirement.

Note: Psych 510 may be taken any time during the four years.

Psychology Graduate Courses**500R. Research Methods. (3)**

Intermediate course for first-year graduate psychology students, focusing on methodological tactics rather than statistical skills.

501. Data Analysis in Psychological Research 1. (5)
Prerequisite: Psych 301 or Stat 222; or Stat 221, 223.

Using and interpreting major quantitative methods in psychology; some commonly used computer methods.

502. Data Analysis in Psychological Research 2. (5)

Prerequisite: Psych 501 or instructor's consent.

Analysis of variance and covariance, multiple regression, and experimental design; introduction to multivariate methods.

510. History and Systems of Psychology. (3)

Survey of origins and development of modern psychology, including consideration of schools and theoretical systems.

511. Philosophy of Science for the Social Sciences. (3)

Prerequisite: instructor's consent or admission to PhD program.

Issues in philosophy of science as they apply to social sciences, including considerations of method, epistemology, and construction of knowledge.

520. Advanced Developmental Psychology. (3)

Major research in developmental psychology, emphasizing theory, content, and methodology.

531. Organizational Psychology. (3)

Personal and interpersonal aspects of organizational life; goal setting, decision making, problem solving, communication, control, leadership, motivation, and change.

535. Behavior Modification Techniques. (3)

Practical application of behavior modification to academic discipline; emotional target behaviors of individuals and groups.

540. Personality Theory. (3)

Prerequisite: Psych 341 and 5 additional hours in psychology.

Contemporary theories of personality developed within framework of major psychological systems.

550. Theory and Research in Social Psychology. (3)

Prerequisite: Psych-Soc 350 or instructor's consent.

Current theories and research on interaction with others.

552. Applied Social Psychology. (3)

Prerequisite: Psych-Soc 350; graduate standing or instructor's consent.

Overview of domains in which social psychology theory and research have been applied outside the laboratory.

555. (Psych-Soc) Group Dynamics. (3)

Prerequisite: Psych-Soc 350.

Theories and research on small-group processes and mass behavior.

560. Learning Theory. (3)

Prerequisite: Psych 361 and 5 additional hours in psychology.

Critical review of current theories and persistent problems.

565. Motivational Psychology. (3)

Prerequisite: Psych 365 or equivalent; graduate standing or instructor's consent.

Theoretical, historical, and empirical overview; recent trends and issues; role of animal studies; methodological problems.

575. Cognitive Processes. (3)

Prerequisite: Psych 370, 375, or equivalent; graduate standing or instructor's consent.

Major theoretical and empirical developments. Interaction of sensory, perceptual, learning, and thinking processes.

577. (Psych-CS 535) Human/Computer Interaction. (3)

Prerequisite: graduate or senior standing.

Human/machine interfaces for hardware/software integration. Psychological principles of computer interfacing. Human engineering, ergonomics, software design principles for user-friendly applications.

583. Biological and Health Psychology. (3)

Prerequisite: Psych 381, 382, or equivalent.

In-depth examination of biological bases of behavior from perspective of health and disease.

584. (Psych-Zool) Neurophysiology. (3)

Prerequisite: Zool 460 or equivalent.

Physiology of nerve cells and neuronal interactions.

585. Human Neuropsychology. (3)

Prerequisite: Psych 381, 382 (or instructor's consent).

Critical study of brain-behavior relationships.

586. Hormones and Behavior. (3)

Prerequisite: Psych 381, 382.

Neural and endocrine mechanisms underlying behavior.

587. Sensory and Perceptual Processes. (3)

Prerequisite: Psych 370, 381, 382, or instructor's consent.

Critical examination of sensory mechanisms and perceptual organization.

600R. Seminar in Research Methods. (3)

Prerequisite: Psych 501.

Research strategies, methods, and design including measurement, scaling, questionnaire construction, reliability, validity, and experimental and statistical designs.

605. Professional Seminar in Psychology. (1)

Prerequisite: acceptance into PhD program.

Introduction to major research areas in psychology.

606. Professional and Ethical Issues in Psychology. (1)

Prerequisite: acceptance into PhD program.

Ethical issues in professional and scientific psychology.

607. Research Prospectus Development. (1)

Prerequisite: acceptance into PhD program.

Supervised writing and research leading to completion and defense of prospectus for research thesis.

609. Professional and Ethical Issues in Clinical Psychology. (3)

Prerequisite: acceptance into clinical psychology program.

Ethical issues from a historical and contemporary framework.

610. Theory and Philosophy in Psychology. (3)
Prerequisite: instructor's consent or admission to PhD program.

Philosophical issues underlying psychology, including the nature and importance of theory and theorizing.

611. Psychopathology 1: Adult. (4)
Prerequisite: acceptance into clinical or school psychology.

Etiology and symptoms of dysfunctional behavior and their effects on the individual, family, and community.

612. Psychopathology 2: Developmental. (3)

Prerequisite: acceptance into clinical or school psychology.

Diagnosis and incidence of maladjustment, learning disabilities, abnormalities and subnormalities, and cultural deficits.

622. Assessment 1: Intelligence. (3)

Prerequisite: acceptance into clinical or school psychology.

Methods used in assessing intellectual status in children and adults.

623. Assessment 2: Objective (3)

Prerequisite: acceptance into clinical or school psychology.

Objective methods used in assessing the personality and behavioral characteristics of children and adults.

624. Assessment 3: Projective. (3)

Prerequisite: acceptance into clinical or school psychology.

Projective methods used in assessing the personality and behavioral characteristics of children and adults.

625. Advanced Objective Assessment. (3)

Prerequisite: acceptance into clinical or school psychology.

In-depth look at MMPI.

631. Professional Issues in Organizational Psychology. (3)

Prerequisite: Psych 531.

Consultant involvement in executive and management decision making, focusing on social responsibility and ethics.

640R. Seminar in Personality. (3)

Prerequisite: Psych 540.

Intensive analysis of selected current topics in personality research and theory.

641R. Values and Mental Health. (1-3)

Values and religious issues in personality, psychotherapy, prevention, and mental health education.

644. Rorschach Techniques. (3)

Prerequisite: acceptance into clinical psychology.

Theory and skill training in administering, scoring, and interpreting Rorschach tests.

645. Cultural Diversity and Gender Issues. (3)

Cultural issues in the context of cultural diversity and contemporary social trends.

648R. Seminar in Theoretical/Philosophical Psychology. (3)

Prerequisite: instructor's consent or acceptance into PhD program.

Analysis of theoretical and philosophical issues in the discipline of psychology.

650R. Seminar in Social Psychology. (3)

Prerequisite: Psych 551 and instructor's consent.

Variable topics including attitude change, social cognition, prosocial and antisocial behavior, group dynamics, and organizational psychology.

651. Psychotherapy 1: Interviewing Skills. (3)

Prerequisite: acceptance into clinical psychology.

Theory and techniques of the psychological interview.

652. Psychotherapy 2: Adult. (3)

Prerequisite: acceptance into clinical psychology.

Theory and techniques of adult therapy.

653. Psychotherapy 3: Child and Family. (3)

Prerequisite: acceptance into clinical psychology.

Theory and techniques of child and family therapy.

654. Psychotherapy 4: Adult Group. (3)

Prerequisite: acceptance into clinical psychology.

Theory and techniques of small-group processes.

655. (Psych-Soc 630) Attitude Measurement and Change. (3)

Prerequisite: instructor's consent.

Attitude development, change, and assessment, focusing on both individual and mass persuasion.

660R. Seminar in Learning. (3) On dem.

Prerequisite: instructor's consent.

Critical review of contemporary literature in field of learning psychology.

667R. Seminar in the Experimental Analysis of Behavior. (3) On dem.

Prerequisite: instructor's consent.

Intensive overview of current trends and attendant philosophy. Principal attention given to research and philosophical journals.

675. Personality Dynamics. (3)

Prerequisite: acceptance into clinical psychology.

Theories and applications to clinical situations.

677R. Seminar in Cognitive Processes. (3)

Prerequisite: Psych 575.

Advanced topics in cognitive science and applied artificial intelligence.

678R. Seminar in Mathematical Psychology. (3)

Variable topics including multivariate statistical methods, graphical data analytic techniques, and various mathematical models.

680. Clinical Neuropsychology. (3)

Prerequisite: acceptance into clinical psychology and Psych 585.

Comprehensive study of the human dysfunctional brain.

- 684. Advanced Behavioral Neurobiology.** (3)
Prerequisite: Psych 381, 382.
Intense examination of contemporary developments in psychobiology and behavioral neurosciences.
- 685R. Seminar in Behavioral Neurobiology.** (3)
Critical examination of topics of current interest taken from contemporary literature.
- 687R. Seminar in Psychopharmacology.** (3)
Prerequisite: Psych 585 or equivalent.
Major classes of psychoactive drugs, emphasizing drug-behavioral interactions.
- 691R. Intervention Techniques in the Schools.** (3)
Rationale and procedures for working with children with educational and behavioral problems in school settings.
- 692R. Special Topics in School Psychology.** (2)
Prerequisite: acceptance into school psychology.
Computer use in school psychology.
- 695R. Independent Readings.** (1-3)
Faculty-supervised readings as arranged by student.
- 699R. Master's Thesis.** (1-9)
Concluding research for master's program, culminating in final oral examination.
- 710R. Readings in Clinical Psychology.** (1-3)
Prerequisite: acceptance into clinical psychology.
Guided individual study in various topics.
- 711R. Topics in Clinical Psychology.** (0.5-3)
Prerequisite: acceptance into clinical psychology.
Theory and practice in specific topics.
- 712R. Topics in Neuropsychology.** (3)
Prerequisite: Psych 680 and acceptance into clinical psychology.
Current topics, including adult and child assessment.
Other topics as determined by student interest.
- 740R. Case Conference.** (0.5)
Prerequisite: acceptance into clinical psychology.
Case presentations; professional, ethical, and research issues pertinent to assessment and intervention.
- 741R. Integrative Practicum.** (1-3)
Prerequisite: acceptance into clinical psychology.
Supervised assessment and intervention, integrating psychopathology diagnosis and treatment.
- 742R. Projects in Clinical Psychology.** (3)
Prerequisite: acceptance into clinical psychology.
Advanced study or skill training in various areas.
- 743R. Clerkship.** (1-3)
Prerequisite: acceptance into clinical psychology.
Supervised experience in community agencies.
- 745, 746, 747, 748. Clinical Internship.** (2 ea.)
Prerequisite: acceptance into clinical psychology.
Full-time training at approved mental health agency.
- 797R. Independent Research.** (1-4)
Prerequisite: instructor's consent.
Faculty-supervised research as arranged by student.

- 799R. Doctoral Dissertation.** (1-9)
Concluding research for doctoral program, culminating in final oral examination.

Public Management

Institute of Public Management

Director: N. Dale Wright, 760 TNRB, 378-4221

Faculty/Specialties

Professors

- Brady, F. Neil (1993) PhD, University of Texas, Austin, 1978. Ethics and Organizational Theory.
Cornia, Gary C. (1980) PhD, Ohio State University, 1979. Public Finance and Budgeting.
Hart, David Kirkwood (1983) PhD, Claremont Graduate School, 1965. Ethics.
Knighton, Lennis M. (1971) PhD, Michigan State University, 1966. Accounting, Finance, Performance Evaluation.
Parsons, Robert J. (1970) PhD, University of California, Riverside, 1971. Managerial Economics.
Snow, Karl N., Jr. (1962) DPA, University of Southern California, 1972. Business and Government Relations.
Wright, N. Dale (1968) PhD, University of Southern California, 1972. Organizational Behavior and Theory.

Associate Professors

- Buckwalter, Doyle W. (1968) PhD, University of Michigan, 1968. Urban Management, Public Policy.
Walters, Lawrence C. (1985) PhD, University of Pennsylvania, 1987. Quantitative Methods and Public Policy.
Wheeler, Gloria E. (1978) PhD, University of Michigan, 1972. Statistics and Human Resource Management.

Assistant Professor

- Woller, Gary M. (1991) PhD, University of Rochester, 1992. Public Policy and International Business.

Graduate Degree and Program

MPA Public Administration

The objective of the Master of Public Administration (MPA) Program is to prepare men and women for leadership in the public and not-for-profit sectors. Leadership in this context provides unique opportunities for service to others. Though emphasis is placed on management of government and not-for-profit organizations, many MPA graduates have found their skills to be transferable to the private sector as well.

Executive MPA Program

An Executive MPA Program is offered through the Division of Continuing Education. Persons with significant public management experience who desire to pursue the master's degree program while continuing to work full-time are encouraged to apply. All courses in the program are offered in the evenings.

JD/MPA Program

The university has approved a joint JD/MPA four-year degree for certain qualified students.

Inquiries regarding the Executive MPA Program and the JD/MPA Program should be directed to the Institute of Public Management, 760 TNRB.

Degree and Program Requirements

MPA Master of Public Administration

See the Marriott School of Management Graduate Catalog for details regarding this particular program.

Admission and Entry

I. Application requirements:

- A. Semester of entry and application deadlines:
Fall —February 28 (international)
—May 15 (U.S.)
Exceptions for entry in other semesters may be made for applicants in the Executive MPA Program.
- B. Entrance examination: GMAT; average 1992–93 score: 540.
- C. GPA: Minimum of 3.0 on 4.0 scale for last 60 hours.
- D. A general career interest in public management as reflected in the statement of intent.

- II. Prerequisite: Upon acceptance, applicant will be informed of any background deficiencies.

Requirements for Degree

- I. Credit hours: Minimum 64 course work hours.
- II. Required courses:
 - A. Public administration environment: PMgt 610, 611, 682, 684.
 - B. Human resource management: PMgt 640, 641, 642R, 643.
 - C. Financial resources management: PMgt 603, 604, 622.
 - D. Decision making and analysis: PMgt 630, 632, 685.
 - E. Communication: PMgt 660, 661.
- III. Electives: Determined in consultation with faculty advisor. Some may be taken in other graduate departments.
- IV. Consult Institute of Public Management, 760 TNRB, for additional requirements.

Institute of Public Management Graduate Courses

603. Managerial Accounting and Computer Concepts. (1-4)

Accounting systems and processes emphasizing use of management control, financial analysis, decision making, performance evaluation. Spreadsheets and databased management are covered.

604. Management Cost Analysis. (1-3)

A discussion of accounting for the costs and benefits of programs, with emphasis on cost analysis, cost control, and cost-based budgets and performance reports.

607. Program Evaluation. (3)

A study of basic principles, methods, and standards for financial and performance evaluation.

610. Managerial Economics. (1-3)

The utilization of economic concepts in the public sector, including an analysis of exchange, specialization, costs, markets for goods and services, and market failure.

611. Economic Environment of Public Administration. (2)

An introduction to international and national economic issues and their effect on the public administrator.

619R. Seminar in Economic Analysis. (1-3)

Advanced study in economics with variation in topics to meet current needs.

622. Budget and Finance. (3-4)

Analysis of the acquisition and management of financial resources. Attention is given to organization and responsibility for revenue sources, budget allocation, control, and planning.

624. Advanced Budgeting and Planning. (3)

Emphasis on forecasting revenues and service demands. Special focus on performance measures.

625. Debt Management. (3)

Advanced study of capital markets, debt instruments, bond issues, debt servicing, and financial disclosure requirements.

626. Tax Policy and Management. (3)

A seminar that examines selected issues, tax structure, impact, and management.

627. Cash Management and the Investment of Funds. (3)

A study of cash flow analysis, cash-based budgeting, treasury cash management, cash collection policies, short-term financing, and the temporary investment of idle funds.

628. Managing Public Financial Resources. (2-3)

An applications-oriented approach to effective stewardship of public funds. Decision making techniques for collection, custodianship, control, and disbursal.

629R. Seminar in Financial Management. (1-3)

Advanced study in finance and accounting, with variation in topics to meet current needs.

630. Statistical Analysis. (3)

Use of statistical techniques for decision making, with emphasis on measurement, descriptive statistics, hypothesis testing, and regression.

632. Quantitative Methods. (1-3)

A study of selected quantitative approaches to analysis of management and policy issues. Includes linear programming, DEA, and other techniques.

635. Systems Analysis and Design. (3)

Application of business systems analysis and design to situations ranging from small intracompany functional units to large company-industry interactions.

638. Research Methods. (3)

Introduction to research methodology, including design, measurement, data collection, interpretation, and presentation.

640. Human Resource Management. (2-3)

Current theory and practice of human resource planning, job analysis, position classification, compensation, benefits, and labor relations.

641. Management and Organization Development. (3)

Analysis of organization structure and design, organizational motivation and control, and the management of change in organizations.

642R. Management Development Seminar. (1-3)

Special workshops and seminars designed for personal growth development and assessment of decision-making skills.

643. Management Philosophy and Style. (3)

An experience-based class to help students assess their leadership style and develop a philosophy of management and an understanding of organization behavior.

644. Compensation and Benefits. (3)

A study of systems and procedures for determining and administering pay and employee benefits.

647. Human Resource Staffing. (3)

A study of staffing needs, planning, recruiting, and hiring.

649R. Seminar in Human Resource Management. (1-3)

Advanced study in human resource management with variation of topics to meet current needs.

659R. Seminar in International Management. (1-3)

An examination of international administration, with variation of topics to meet current needs, including comparative administration, technical assistance, and cultural restraints.

660. Written Communications. (1-2)

Development of written communication skills. Effectiveness in writing reports, memoranda, and other management documents is emphasized.

661. Oral Communications. (1)

Development of oral communication skills.

671. Local Government Law. (1-3)

An introduction to contracts, torts, land use, and zoning.

674. Urban Issues. (3)

Study of the major public policy issues facing urban government.

675. Urban Management. (3)

An examination of administrative organization, municipal functions, communications, regulatory procedures, and intergovernmental relations.

676. Urban and Regional Planning. (3)

An examination of the basic principles of planning for urban government. Attention is given to environmental impact statements, specific plans, and implementation procedures in urban planning.

679R. Seminar in Local Government Administration. (1-3)

Advanced study in local government administration, with variation of topics to meet current needs.

681. Human Resource Law. (1-3)

An introduction to human resource law.

682. Ethics for Management. (3)

An analysis of the forces operating on the manager and the ethical considerations of leadership in a democratic, pluralistic society.

684. Environment and Process of Public Administration. (3)

A study of the governmental, legal, political, and social environment of public administration.

685. Management Strategy and Organization Policy. (3)

Management approach to the determination of mission, goals, policy, and implementation of programs. Emphasis is placed on environment, decision making, and utilization of human and financial resources.

687. Health and Human Service Issues. (3)

Study of health and other social policy issues, emphasizing their impact on organizations.

688. Business-Government Relations. (3)

The interaction between business and government organizations, including the influence of business leaders on public policy and the regulation of business by government organizations.

689. Public Policy Analysis. (3)

Examination of forces and events in the formulation of public policy. Concepts for analysis of public policy are surveyed.

691R. Readings and Conference. (1-3)

Prerequisite: department's consent.

Individualized reading and consultations.

692R. Directed Research. (1-3)

Prerequisite: department's consent.

The study and application of research methods relative to managers.

693R. Practicum. (1-4)

Prerequisite: department's consent.

A planned application of administrative concepts in a management work situation and an analysis of the impact.

Recreation Management and Youth Leadership

Chair: S. Harold Smith, 279 RB, 378-4369

Graduate Coordinator: Thomas S. Catherall, 273-G RB, 378-4991

Faculty/Specialties

Professors

deHoyos, Benjamin F. (1961) PhD, University of Utah, 1969. Research.

Gray, Howard R. (1979) PhD, Pennsylvania State University, 1977. Therapy, Gerontology, Research.

Naylor, Jay H. (1959) EdD, University of Utah, 1973. Administration.

Smith, S. Harold (1988) PhD, University of Utah, 1974. Therapeutic Recreation, Research, Leisure Behavior.

Thorstenson, Clark T. (1969) PhD, University of Utah, 1969. Therapeutic Recreation.

Associate Professors

- Catherall, Thomas S. (1971) EdD, Brigham Young University, 1980. Youth Research.
 Olsen, Burton K. (1965) PhD, University of Minnesota, Minneapolis, 1970. Community School.

Graduate Degree and Program

MA Recreation Management and Youth Leadership

Degree and Program Requirements**MA Recreation Management and Youth Leadership****Admission and Entry****I. Application requirements:**

- A. Semesters of entry and application deadlines:
 Fall —March 1 (U.S. and international)
 Winter —March 1 (U.S. and international)
 Spring —March 1 (U.S. and international)
 Summer —March 1 (U.S. and international)
 - B. GPA: Minimum of 3.0 for last 60 semester hours of undergraduate work.
 - C. Entrance exam: GRE General Test.
- II. Prerequisite: Undergraduate major or minor in recreation or youth leadership. Applicants with other backgrounds may be admitted provisionally but must complete selected prerequisite classes.

Requirements for Degree

- I. Credit hours:
 - A. Thesis option (30): 24 course work hours plus 6 thesis hours (RMYL 699R).
 - B. Professional option (36): 33 course work hours plus 3 internship hours (RMYL 599R).
- II. Required courses: Determined in consultation with advisory committee.
- III. Minor (optional): Any approved minor.
- IV. Thesis or internship.
- V. Examination: Oral defense of thesis for thesis option, and professional work for professional option.

Recreation Management Graduate Courses**599R. Internship. (1-8)**

Prerequisite: instructor's consent.
 Professional leadership practicum.

610. Research Methods in Recreation. (3)

Preparing research proposals and guidelines for thesis writing.

611. Philosophical Foundations in Recreation. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Review of philosophical foundations and conceptual bases for recreation and leisure in society.

615. Process Facilitation in Recreation. (2)

Identifying and applying various functions and roles of the recreation process facilitator.

619. Needs Assessment in Community Planning. (3)

Prerequisite: RMYL 610.

On-location data analysis and scientific report writing of a professional project.

650. Issues in Leisure and Recreation. (3)

Prerequisite: formal acceptance into recreation management graduate program.

A graduate seminar on current issues and trends in leisure studies and recreation.

680. Public Relations and Communications in Recreation Management. (2)

Solving human relations problems in recreation management.

685. Recreation Administration. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Emphasis in managing, organizing, budgeting, and staffing issues, as well as personnel administration, policy development, strategic planning, administrative practices, etc.

694. Readings in Recreation Literature and Research. (2)

Readings from professional literature; group discussion.

699R. Master's Thesis. (1-9)**Religion****Ancient Scripture**

Chair: Stephen E. Robinson, 375-A JSB, 378-2067

Graduate Program

Minor: Ancient Scripture

The Department of Ancient Scripture offers a graduate minor but not a graduate major. See the BYU Undergraduate Catalog for faculty listings.

Program Requirements**Minor: Ancient Scripture**

- I. Credit hours:
 - A. Master's level: 9 approved hours, no more than 2 hours of which may be readings courses.
 - B. Doctoral level: Minimum of 12 hours determined in consultation with major department chair.
- II. Required courses: Determined with approval of Ancient Scripture Department chair. Courses in biblical languages such as Heb 331 and 531 or Greek 411, 612, and 613 that could strengthen a graduate minor in ancient scripture would be in addition to the minimum hours required in religion.
- III. Advisory committee: Must include one member from ancient scripture faculty.
- IV. Credit limitation: No undergraduate credit may apply.

Ancient Scripture Graduate Courses**501. Analysis of the Old Testament: The Pentateuch and Historical Books. (3)**

502. Analysis of the Old Testament: Prophetic Books. (2)
503. Analysis of the Old Testament: Poetic and Wisdom Literature. (2)
- 510R. Special Topics in Ancient Scripture. (1-3)
Prerequisite: LDS Church Seminaries and Institutes personnel only.
Subjects and questions typically addressed by Church Educational System instructors. No more than 3 hours may apply toward a graduate degree.
511. The Gospels. (2)
512. Paul's Life and Letters. (2)
513. The General Epistles and Revelation. (2)
514. Historical Background of the New Testament. (2)
- 521, 522. Analysis of the Book of Mormon. (3 ea.)
523. External Evidence of the Book of Mormon. (2)
527. History and Doctrines of the Pearl of Great Price. (3)
606. The Apocrypha and Pseudepigrapha. (2)
- 610R. Graduate Seminar in Ancient Scripture (1-3)
- 620R. Directed Readings in Ancient Scripture. (1-3)
Prerequisite: graduate standing and instructor's consent.

Church History and Doctrine

Chair: Leon R. Hartshorn, 375-B JSB, 378-3691

Graduate Program

Minor: Church History and Doctrine

The Department of Church History and Doctrine offers a graduate minor but not a graduate major. See the BYU Undergraduate Catalog for faculty listings.

Program Requirements

Minor: Church History and Doctrine

- I. Credit hours:
 - A. Master's level: 9 approved hours.
 - B. Doctoral level: Minimum of 12 hours determined in consultation with major department chair.
- II. Required courses: Determined with approval of Church History and Doctrine Department chair.
- III. Advisory committee: Must include one member from Church history and doctrine faculty.
- IV. Credit limitation: No undergraduate credit may apply.

Church History and Doctrine Graduate Courses

- 510R. Special Topics in Church History and Doctrine. (1-3)
Prerequisite: LDS Church Seminaries and Institutes personnel only.
Subjects and questions typically addressed by Church Educational System instructors. No more than 3 hours may apply toward a graduate degree.
- 524, 525. Analysis of the Doctrine and Covenants. (3 ea.)
530. LDS Doctrine. (2)
- 540R. Special Topics in Church History and Doctrine. (2-3)
Independent Study available to commissioned and prospective chaplains only.
Topics include Joseph Smith's thought, Church doctrine, schismatic movements in Church history, historical setting of the Restoration, comparative American religions, Near Eastern religions, etc.
541. Documents of LDS Church History (1805-1844). (3)
542. Documents of LDS Church History (1844-1900). (3)
543. Documents of LDS Church History (Twentieth Century). (3)
551. History of the Early Church Through the Fourth Century. (3)
552. Medieval and Reformation Christianity. (3)
553. History of Christianity Since the Seventeenth Century. (3)
- 555, 556. Comparative World Religions. (2 ea.)
- 640R. Graduate Seminar in Church History and Doctrine. (1-3)
Topics include the Doctrine and Covenants, LDS Church history, LDS doctrine, Christian history, Christian theology, world religions, etc.
- 650R. Directed Readings in Church History and Doctrine. (1-3)
Prerequisite: graduate standing and instructor's consent.
Topics include the Doctrine and Covenants, LDS Church history, LDS doctrine, Christian history, Christian theology, world religions, etc.

Secondary Education

Chair: C. Garn Coombs, 110 MCKB, 378-4250
Graduate Coordinator: Joseph Hugh Baird, 149-F MCKB, 378-3177

The Department of Secondary Education does not offer a graduate degree but offers the following graduate courses. Refer to the BYU Undergraduate Catalog for faculty listings.

Secondary Education Graduate Courses

Note: ScEd 514R is for in-service education purposes only. Topics are listed in the BYU Undergraduate Catalog.

515R. Special Topics in Education. (1-3) On dem.

- Learning and Teaching
- Science Education
- Middle Education
- Teaching Reading in the Content Area

531. Effective Classroom Instruction. (2) F, Su

Developing strategies to initiate and to maintain effective learning in elementary and secondary classrooms. Expanding teaching perspectives and acquiring observation skills.

539R. Practicum in Learning and Teaching. (1-8) F, W, Sp, Su

Experience in a school setting under direction of college faculty.

601. Structure, Function, and Outcomes of Education.

(3) F, Su

Relationships between purposes of education and means selected to achieve those aims. Establishing and maintaining integrity in educational practice.

606. Western Educational Thought and Practice. (3) W, Su

History of educational thought and practice, including pedagogical reform, national systems, and recent trends.

607. Multicultural Education. (3) F, Sp

Exploring common cultural universals from archaic and modern societies to develop skills for learning within a culturally diverse environment.

649. College and Adult Basic Reading. (2) Sp

Prerequisite: one course in reading or instructor's consent.

Adult basic education programs; advanced work in community college and university reading services.

660. Historical Foundations in Reading. (2) W

An in-depth study of the history of reading education, books, and reading instruction with implications for present-day reading practices.

693R. Directed Individual Study. (1-4) F, W, Sp, Su

698R. Master's Project. (1-6) F, W, Sp, Su

699R. Master's Thesis. (1-6) F, W, Sp, Su

Social Work

School of Social Work

Director: Barbara R. Wheeler, 223 KMB, 378-3282

Associate Director/Graduate Coordinator: Kyle L. Pehrson, 217 KMB, 378-4410

Fieldwork Educational Director: W. Eugene Gibbons, 216 KMB, 378-7756

Faculty/Specialties

Professors

Blake, Reed H. (1967) PhD, Utah State University, 1969. Social Psychology, Technical Writing,

Communication, Disaster Planning, Research.

Gibbons, W. Eugene (1969) DSW, University of Utah, 1974. Psychiatric/Clinical Social Work, Family.

Pehrson, K. Lynn (1990) DSW, Catholic University, 1980. Human Behavior, Group Work, Family and Children.

Associate Professors

Horton, Anne L. (1984) PhD, University of Wisconsin, Madison, 1983. Clinical Social Work, Marriage and Family, Domestic Violence.

Seipel, Michael M. O (1982) PhD, Cornell University, 1982. Social Welfare Policy, Community Organization, Ethnic Studies.

Tanner, Elvin R. (1970) PhD, Brigham Young University, 1969. Clinical Social Work, Personal Counseling,

Marriage and Family Systems, Cognitive Therapy.

Wheeler, Barbara R. (1979) DSW, University of Utah, 1978. Psychiatric/Clinical Social Work, Marriage and Family Therapy, Children, Gender.

Assistant Professors

Cerdeis, Karen E. (1992) PhD, Florida State University, 1993. Social Welfare, Community Organization, Research.

Marett, Kevin M. (1992) PhD, Purdue University, 1989. Marriage and Family, Human Behavior, Clinical Social Work.

Norman, Judith L. (1990) DSW, University of Utah, 1990. Psychiatric/Clinical Social Work, Family and Children.

Pearson, Dale F. (1970) PhD, Brigham Young University, 1981. Clinical Social Work, Marriage and Family Therapy, Families and Children.

Spaid, Wanda M. (1988) DSW, University of Utah, 1989. Clinical Social Work, Human Behavior, Research Methodology.

Graduate Degree and Program

MSW Social Work

The graduate program is designed to train students who are committed to the general objectives of the profession of social work, i.e., to promote the general welfare of society by enhancing the social functioning of individuals, families, groups, organizations, and communities. The basic objective of the MSW program is to help students acquire the knowledge, skills, attitudes, and values that prepare them for advanced clinical practice.

The program offers one method of concentration, i.e., preparation for clinical practice. The emphasis of the cur-

riculum is on family and children. The curriculum design was developed within the framework of systems theory as an integrating concept. The practice courses have been designed to interface the psychosocial approach to social work practice with the systems framework. Such an approach enables the practitioner to be responsive to the special issues of diversity in pluralistic societies such as race, ethnicity, sexism, and cultural differences.

Degree and Program Requirements

MSW Social Work

Program accredited with the Council on Social Work Education.

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 1 (U.S. and international)
- B. Entrance examination: At school's discretion.
- II. Prerequisite: Applicants are expected to have prepared themselves for the MSW program by completing course work and developing a base of knowledge and skill in the following areas:
 - A. Research (5 hours): Research*, statistics*.
 - B. Human biology* (3 hours).
 - C. Behavioral sciences (6 hours): Abnormal behavior*, personality theory, learning theory, child development, family theory, etc.
 - D. Social sciences (3 hours): Social psychology, sociological theory, social organization; social welfare policy, political science, social legislation, etc.
 - E. Interpersonal skills (4 hours): Therapeutic communication, casework, group work, counseling, etc.
 - F. Introduction to Social Work course*

*Specifically required

Requirements for Degree

- I. Credit hours: Minimum of 64 course work hours distributed as follows: social work practice courses (17 hours), human behavior and social environment (10 hours), social welfare policy (6 hours), research (7 hours), professional seminar (2 hours), field practicum (14 hours), electives (8 hours).
- II. Electives: 8 hours, 6 of which are clinical. In addition to the required courses, MSW candidates must select at least one elective from SocW 638 or 641. The remaining electives may be chosen from among other social work electives. One of the elective classes may be selected from a variety of clinical/family courses outside the school or from other educational opportunities to be negotiated with the faculty advisor.
- III. Research project (SocW 698R).
- IV. Examination: Oral examination and defense of research project.

Program and Degree Resources

Camilla Eyring Kimball Chair of Home and Family Life Comprehensive Clinic

Family and Demographic Research Institute
Women's Research Institute

Social Work Graduate Courses

567. Social Services for the Aging. (2)

Prerequisite: instructor's consent.

Process and impact of social service delivery systems on the aged. Does not count as social work elective.

595R. Directed Readings. (1-3)

Prerequisite: instructor's consent.

600R. Social Work Research. (2)

Overview and application of qualitative and quantitative social work research and statistical analysis. Issues of research ethics and oppressed populations are emphasized. For majors only.

610. Single Subject and Program Evaluation. (2)

Prerequisite: SocW 600R and statistics examination.

Statistical analyses, basic research principles, application of single subject design, and program evaluation for social workers. For majors only.

612. Human Behavior and Social Environment 3: Psychopathology. (3)

Prerequisite: Psych 342 or equivalent, SocW 620.

Etiology and symptoms of dysfunctional behavior and their effects on the individual, family, and community. For majors only.

620. Human Behavior and Social Environment 1: Child, Youth, and Young Adult Development. (3)

Development of children, adolescents and young adults as individuals and members of families, other groups, organizations, and communities. Emphasizes cultural, social, psychological, biological, spiritual, physical forces.

621. Human Behavior and Social Environment 2: Adult Development and Aging. (2)

Prerequisite: SocW 620.

Development in middle and later adulthood as individuals and members of families, other groups, organizations, and communities. Emphasizes cultural, social, psychological, biological, spiritual, and physical forces.

630. Social Welfare Policy I: A Framework for Analysis, Goal Setting, and Change. (3)

Analyzing and changing social policies and programs. For majors only.

631. Social Welfare Policy 2: Social Work and Family Law. (3)

Prerequisite: SocW 630.

The law relative to formation, functioning, and dissolution of families and delivery of social services to them. For majors only.

638. Practice in Child Services. (2) Alt. term

Prerequisite: instructor's consent.

Working with the social service delivery system on problems related to child neglect and abuse, foster care, adoptions, etc.

641. Interventive Methods with Children and Adolescents. (2)

Prerequisite: instructor's consent.

Use of interventive methods in treating child and adolescent problems in addition to understanding the reciprocal impact of significant systems, i.e., school, family, peers, church, health.

642. Marriage and Family Theories and Treatment. (2)

Prerequisite: instructor's consent.

Various models of marriage and family treatment; appropriate intervention skills. For majors only.

643. Advanced Marriage and Family Practice. (2)

Prerequisite: SocW 642.

Advanced methods of intervention with marital dyads, family, and community. For majors only.

644. Clinical Intervention with Special Populations. (2)

Prerequisite: instructor's consent.

Applying core clinical practice skills to distinct groups representing racial, ethnic, and cultural diversity.

645. Theological Perspectives on Social Work Practice. (2)

Prerequisite: instructor's consent.

Interface of religious and social work values, attitudes, and principles.

646. Women's Issues in Social Work Practice. (2)

Prerequisite: instructor's consent.

Social work practice and specific problems and issues associated with both genders but focusing on the changing expectations and roles of women.

647R. Special Topics in Advanced Clinical Practice. (2)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Object Relations Therapy
- Cognitive Therapy
- Understanding the Professional Self and the Therapeutic Alliance

648. Selected Fields of Practice. (2)

Current problems and treatments in social work practice such as family violence, addiction, and human sexuality.

649. Evaluative Instruments in Social Work Practice. (2)

Using assessment instruments to guide treatment, evaluate therapeutic outcomes, and conduct practice research.

654R. Field Practicum. (1–3)

Prerequisite: first-year placement.

Practicum in social service agencies with an integrative seminar to examine relationship between theory and practice. For majors only.

655R. Field Practicum. (1–3)

Prerequisite: second-year placement.

Practicum in social service agencies with an integrative seminar to examine relationship between theory and practice. For majors only.

660. Social Work Practice: Casework. (2)

Prerequisite: SocW 620 or concurrent registration.

Psychosocial assessment of individuals and implementing interventions. Skills laboratory required. For majors only.

661. Social Work Practice: Advanced Casework. (3)

Prerequisite: SocW 660.

Building on skills acquired in SocW 660; using different microintervention models and approaches. For majors only.

662. Social Work Practice: Group Work. (2)

Prerequisite: SocW 620 or concurrent registration.

Structure, function, dynamics, and development of small groups, with special emphasis on group models and group theory. For majors only.

663. Social Work Practice: Advanced Group Work. (2)

Prerequisite: SocW 662.

Applying group theory to individual and family problems. Role of social workers in group process. Group leadership experience required. For majors only.

664. Social Work Practice: Community Organization. (2)

Prerequisite: SocW 621 or concurrent registration.

Basic practice theory, tactics, and strategies in working with neighborhoods, communities, and organizations toward planned change. For majors only.

665. Social Work Practice: Introduction to Human Services Administration. (2)

Key managerial functions of complex organizations and institutions: administrative theory and selected management techniques. For majors only.

666. Social Work Practice: Advanced Clinical Methods in Assessment/Intervention. (2)

Prerequisite: SocW 661.

Linking psychosocial assessment with advanced clinical theory, skills, and techniques. For majors only.

693R. Seminar in Professional Philosophy, Values, and Ethics of Social Work Practice. (2)

Philosophical and ethical basis for social work and family therapy practice, including integrative framework for defining and implementing professional practice. For majors only.

698R. Master's Research Project. (1–3)

Prerequisite: SocW 600R, 610.

Applying research and statistical methods to evaluative, experimental, and survey studies in social work. Research report of publishable quality required. For majors only.

Sociology

Chair: J. Lynn England, 894 SWKT, 378-3115
Graduate Coordinator: Darwin L. Thomas, 844 SWKT,
378-6706

Faculty/Specialties

Professors

- Albrecht, Stan L., (1974) PhD, Washington State University, 1970. Social Psychology, Research Methodology.
- Bahr, Howard M. (1973) PhD, University of Texas, Austin, 1965. Urban Problems, Ethnic Relations.
- Bahr, Stephen J. (1973) PhD, Washington State University, 1972. Family, Deviance, Law.
- Chadwick, Bruce A. (1972) PhD, Washington University, 1967. Research Methods, Family, Social Change, Sociology of Work.
- Duke, James T. (1963) PhD, University of California, Los Angeles, 1963. Sociological Theory, Sociology of Religion.
- England, J. Lynn (1970) PhD, University of Pittsburgh, 1971. Theory, Community, Social Impact.
- Heaton, Tim B. (1980) PhD, University of Wisconsin, Madison, 1979. Demography, Rural Sociology, Stratification, Family.
- Jacobsen, Cardell K. (1981) PhD, University of North Carolina at Chapel Hill, 1971. Social Psychology, American Race/Ethnic Relations.
- Johnson, Barry L. (1965) PhD, University of North Carolina, 1977. Statistics, Medical Sociology, Research Methods.
- Kunz, Phillip R. (1968) PhD, University of Michigan, 1967. Complex Organization, Population, Family.
- Segar, John F. (1967) PhD, University of Kentucky, Lexington, 1968. Social Organization, Social Psychology, Ethnic Relations.
- Thomas, Darwin L. (1972) PhD, University of Minnesota, St. Paul, 1968. Family, Social Psychology, Parent-Child Interaction.
- Warner, W. Keith (1971) PhD, Cornell University, 1960. Complex Organization, Social Organization, Rural Sociology, Education.

Associate Professors

- Johnson, Richard E. (1976) PhD, University of Washington, 1976. Deviance, Criminology, Juvenile Delinquency.
- Spencer, Berkley A. (1969) PhD, Cornell University, 1967. Development, Latin American Studies, Planned Change.

Assistant Professors

- Barber, Brian (1990) PhD, Brigham Young University, 1987. Sociology of the Family.
- Cornwall, Marie (1986) PhD, University of Minnesota, 1985. Religion, Family, Research.
- Duke, James B. (1990) PhD, Harvard University, 1991. Social Stratification, Sociology of Education, Sociological Theory, Structural Analysis.
- Ward, Carol J. (1990) PhD, University of Chicago, 1992. Race and Ethnic, Sociology of Education.

Young, Lawrence A. (1985) PhD, University of Wisconsin, Madison, 1989. Complex Organization, Religion, Education.

Graduate Degrees and Programs

PhD Family Studies
MS, PhD Sociology

Degree and Program Requirements

MS Sociology

Students who are interested in pursuing the master's degree in sociology should direct inquiries to the Department of Sociology for advisement and a broader description of the program.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
 - B. Entrance examination: GRE General Test.
- II. Prerequisite: Baccalaureate degree in sociology or equivalent.

Requirements for Degree

- I. Credit hours (30): Minimum of 24 course work hours, including at least 15 hours of formal course work in sociology, plus 6 hours of thesis (Soc 699R) or 6 hours of project (Soc 698R). Only course work with a grade of B- or better is acceptable.
- II. Required courses: Soc 600, 606, 611; 620 or 650.
- III. Demonstration of competence in sociological theory, research methods, and statistics.
- IV. Thesis or project.
- V. Examination: Oral defense of thesis or project.

PhD Sociology

PhD Family Studies

Students who desire a PhD in sociology may pursue either the regular sociology program or the family studies program. Students in the regular sociology program may emphasize social organization, social psychology, or sociology of religion. The family studies program is a joint PhD program between the Sociology Department and the Family Sciences Department. Students who plan to specialize in family sociology are required to take the family studies option, and students who plan to choose other fields should take the regular sociology option. Please direct inquiries to the Department of Sociology for a broad description of the program.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 1 (U.S. and international), Family Studies
 - B. Fall —February 15 (U.S. and international), Sociology
- II. Entrance examination: GRE General Test.
- III. Prerequisite: Master's degree in sociology or equivalent; master's thesis.

Requirements for Degree

- I. Credit hours (66 plus skill): 48 hours of approved course work, plus 18 dissertation hours (Soc 799R) and the skill requirement. Only course work with a grade of B- or better is acceptable.
- II. Required courses: Soc 706, 711; minimum of 6 hours selected from Soc 601, 602, 604, 608; minimum of 9 hours in each of two specialty areas selected for comprehensive examinations.
- III. Demonstration of competence at the doctoral level by required course work and by examination in sociological theory, research methods, and statistics.
- IV. Language/ Skill requirement:
 - A. Single language option: In-depth proficiency.
 - B. Two languages option: Reading ability.
 - C. One language and skill option: Reading ability in French, German, Spanish, or Russian; 8–10 hours of statistics, computer science, and mathematics, or of Soc 400, 504, 608, 706; FamSc 602.
 - D. Single skill option: Minimum 18 hours, approved by advisory committee, of statistics, computer science, and mathematics, or of courses listed in C, above.
- V. Dissertation.
- VI. Examinations:
 - A. Written comprehensive examination in two of the following areas of emphasis: family sociology, social psychology, social organization, or religion.
 - B. Oral defense of dissertation prospectus.
 - C. Oral defense of dissertation.

Program and Degree Resources

Center for Studies of the Family
Women's Research Institute

Sociology Graduate Courses**503. Advanced Social Science Computing. (3)**

Prerequisite: Soc 303, 400, or instructor's consent.

Appropriate use of computer technology and software in social science scholarship and research: data acquisition and management, advanced statistical methods, computer information retrieval and exchange.

504. Mathematical Sociology. (3) On dem.

Prerequisite: Math 105.

Mathematical techniques of simulating and modeling social processes.

515. Seminar in Sociological Practice. (3)

Prerequisite: Soc 315, 600, 606, 610.

Uses of sociological theory and methods to deal with individual, organizational, and societal problems. Techniques for communicating such knowledge to the non-sociologist.

524. Advanced Political Sociology. (3)

Social basis of political behavior. Modern theories and research concerning use of power and decision making.

525. Sociology of Religion. (3) On dem.

Prerequisite: Soc 111, 325, or instructor's consent.

Influences of social factors in the development of various religious systems.

527. Sociology of the LDS Church and Its People. (3)

The LDS Church from a social science perspective, including the Church as a new religious movement; LDS culture; the institutionalization process.

530. Sociology of International Development. (3)

Major theoretical paradigms of development with strategies and practical application in the international setting.

545. Population Analysis. (3) On dem.

Prerequisite: Soc 205 or equivalent.

Availability, use, and interpretation of population data for local, state, and national areas applied to planning and evaluation.

550. (Soc-FamSc) History and Development of Theory About the Family. (3) F

Prerequisite: FamSc 250, Soc 311, or equivalent.

Historical/intellectual roots of theorizing about families; paradigms and assumptions underlying theorizing; contemporary research and theory interface.

560. (Soc-FamSc) Contemporary Theories About the Family. (3) On dem. W

Prerequisite: Soc 550 or instructor's consent.

Contemporary theories and research about the family, emphasizing role, exchange, and systems theories.

561. The Family Institution. (3) On dem.

The family in different societies; problems created by various family systems.

565. (Soc-FamSc 663) The Individual and Family in Later Years. (3) On dem.

Developmental aspects of aging, focusing on the biophysical, cognitive, social, affective, and pathological dimensions in people aged fifty and over.

590R. Special Topics in Sociology. (1–3)

Prerequisite: instructor's consent.

Course content varies from year to year.

595R. Directed Readings. (1–3)

Individualized reading program supervised by faculty member. Pass/Fail only.

600. (Soc-FamSc) Advanced Research Methods. (3)

Prerequisite: Soc 300 or equivalent.

Training in survey, experimental, secondary, and content analysis; qualitative, evaluation, and environmental impact research techniques.

601. (Soc-FamSc) Seminar in Survey Research. (3) On dem.

Prerequisite: Soc-FamSc 600 or equivalent.

Survey research techniques of the behavioral sciences; emphasizes research and sampling designs.

602. (Soc-FamSc) Experimental Design. (3) On dem.

Prerequisite: Soc-FamSc 600, Stat 501 or equivalent, or instructor's consent.

Research methods, logic, writing, and data analysis.

603R. (Soc-FamSc) Research Practicum. (3) On dem.
Prerequisite: instructor's consent.

Design, data collection, data analysis, and write-up.

604. Ethnographic Research Techniques. (3)

Prerequisite: Soc-FamSc 600.

Rationale, methods, and limitations of qualitative research; includes participant observation and hermeneutic skills.

606. Intermediate Statistics. (3)

Prerequisite: Soc 205 or equivalent; Soc 400 or concurrent registration.

Probability, estimation, hypothesis testing, correlation analysis, multiple regression, analysis of variance, and nonparametric methods for sociologists and other social scientists.

608. Sociological Measurement. (3)

Prerequisite: Soc-FamSc 600, Soc 606.

Unidimensional and multidimensional measurement techniques, emphasizing theoretical, methodological, and substantive consequences of technique selection.

611. Seminar in Contemporary Sociological Theory. (3)

Prerequisite: Soc 311.

Contemporary theories: structural functionalism, conflict theory, exchange theory, and symbolic interactionism.

612. Seminar in the Development of Sociological Theory. (3) On dem.

Prerequisite: Soc 610.

Contributions of sociological theorists, including Durkheim, Weber, Pareto, and Simmel.

620. Theory and Research in Social Organization. (3)

On dem.

Prerequisite: admission to graduate sociology programs; others by instructor's consent.

Graduate survey of the field of social organization and the core subfields therein.

621. Complex Organizations. (3) On dem.

Prerequisite: instructor's consent.

Theoretical approaches and empirical studies of organizations, their structures, processes, and problems; studies of industrial organizations, universities, hospitals, etc.

622. Social Stratification. (3) On dem.

Prerequisite: Soc 111.

Status, class, and power systems in various societies.

623. Seminar in Race and Ethnic Relations. (3) On dem.

Major theories of race-ethnic relations; critical issues in the field.

625R. Seminar in the Sociology of Religion. (3)

In-depth analysis of theory and research in topical areas of the sociology of religion. Course content varies from year to year.

630. (Soc-Psych 655) Attitude Measurement and Change. (3) On dem.

Prerequisite: instructor's consent.

Attitude development, change, and assessment, focusing on both individual and mass persuasion.

637. Sociology of Feminist Theory. (3)

Prerequisite: Soc 367.

Analysis of traditionally accepted models by Freud, Erikson, and Kohlberg from a feminist perspective; review of contemporary theorists' works such as Chodorow, Gilligan and Elshtain; French and American differences.

650. Advanced Social Psychology. (3) On dem.

Processes of social influence, emphasizing theory and research testing. Basic principles of social behavior.

660. (Soc-FamSc) Parent-Child Interaction. (3)

Socialization of children in families, focusing on parent-child relationships from infancy through adolescence. Current theory and empirical research emphasized.

670. Contemporary Urban Social Structure. (3) On dem.

Prerequisite: Soc 370.

Research-oriented examination of social forces in contemporary urban life that influence patterns of human interaction.

678. Social Policy and Feminist Legal Thought. (3)

Prerequisite: instructor's and department's consent; law students have priority. (Taught by law instructor with law students in class.)

Survey of recent literature regarding the impact of women on law and legal institutions and the impact of law and legal institutions on the definitions, roles, and status of women in our society.

681R. Seminar in Deviance, Crime, and Corrections. (3) On dem.

Prerequisite: Soc 380, 381 or 383, or instructor's consent.

In-depth analysis of current issues in the field. Tailored to student interests.

692R. (Soc-FamSc) Seminar in Family Relationships. (3)

Prerequisite: Soc-FamSc 560.

Theory and research in topical areas of family study (topics presented on alternate years):

- Marital Stability
- Power and Gender Roles
- Marital Quality and Communication
- Family and Religion
- Household and Family Demography

697R. Directed Research. (1–3) On dem.

698R. Master's Project. (1–6)

Scholarly research or development project; demonstrates student's ability to use sociological concepts.

699R. Master's Thesis. (1–6)

706. Advanced Statistical Methods. (3)

Prerequisite: Soc 606.

Advanced multivariate analysis; analysis of variance and covariance, multiple regression, linear models, latent variables, log-linear models, event history analysis.

711. Sociological Theory and Theory Building. (3)

Prerequisite: Soc-FamSc 600, Soc 606, 610.

Latest contributions to theory; current endeavors in construction of sociological theories.

720R. Seminar: Social Organization. (1-3) On dem. Prerequisite: Soc 111, 620.

750. Seminar: Social Psychology. (3) On dem. Prerequisite: Soc-Psych 650 and instructor's consent.

792R. (Soc-FamSc) Family Symposium. (0.5)

799R. Doctoral Dissertation. (1-9)

Spanish and Portuguese

Chair: John R. Rosenberg, 4050-A JKHB, 378-2837
Graduate Coordinator: J. Halvor Clegg, 4028 JKHB, 378-3373

Faculty/Specialties

Professors

- Cluff, Russell M. (1983) PhD, University of Illinois, 1978. Spanish-American Literature.
 Dennis, Ronald D. (1966) PhD, University of Wisconsin, Madison, 1972. Brazilian Literature.
 Forster, Merlin H. (1987) PhD, University of Illinois, 1960. Spanish-American Literature.
 Larson, Jerry W. (1980) PhD, University of Minnesota, Minneapolis, 1977. Spanish Language Acquisition, Methodology, Media Specialist, Language Laboratories.
 Lyon, Thomas E. (Ted) (1972) PhD, University of California, Los Angeles, 1967. Spanish-American Literature.
 Moon, H. Kay (1963) PhD, Syracuse University, 1963. Spanish Literature.
 Quackenbush, L. Howard (1970) PhD, University of Illinois, 1970. Spanish-American Literature.

Associate Professors

- Alba, Orlando. (1993) PhD, Universidad Complutense de Madrid, Spain, 1988. Hispanic Sociolinguistics.
 Ashworth, Peter P. (1966) PhD, University of Oklahoma, 1967. Spanish Literature.
 Clegg, J. Halvor (1972) PhD, University of Texas, Austin, 1969. Phonology, Spanish Language, Linguistics.
 Fails, Willis C. (1981) PhD, University of Texas, Austin, 1984. Spanish and Portuguese Linguistics.
 Jensen, Gordon K. (1969) PhD, University of Wisconsin, Madison, 1975. Portuguese and Brazilian Literature.
 Lund, Christopher C. (1992) PhD, University of Texas, Austin, 1970. Classical Portuguese Literature.
 Meredith, Robert Alan (1977) PhD, Ohio State University, 1976. Spanish Language, Teaching Methodology.
 Ramsey, Myriam (1975) PhD, University of North Carolina, Chapel Hill, 1975. Brazilian Literature.
 Rosenberg, John R. (1985) PhD, Cornell University, 1985. Contemporary Peninsular Literature.

Assistant Professors

- Labrum, Marian B. (1974) PhD, Middlebury College, 1988. Spanish-American Literature, Translation.
 Mathews, Thomas J. (1991) PhD, University of Delaware, 1992. Spanish Teaching Methodology.
 Rojas, Hilda (1991) PhD, Universidad Complutense de Madrid, Spain, 1990. Spanish-American Literature.

Turley, Jeffrey S. (1989) PhD, University of California, Berkeley, 1992. Spanish Linguistics and Medieval Literature.

Graduate Degrees and Programs

- MA Portuguese
 MA Spanish
 MA Language Acquisition (Portuguese)

Areas of Specialization

Portuguese Language, Portuguese Literature, Spanish Language, Spanish Literature, Spanish Teaching

Degree and Program Requirements

MA Portuguese

Portuguese Language
 Portuguese Literature

Admission and Entry

- I. Semesters of entry and application deadlines:
 Fall —February 15 (U.S. and international)
 Winter —June 30 (international)
 —September 15 (U.S.)
 Spring —September 15 (U.S. and international)
 Summer —September 15 (U.S. and international)
- II. Prerequisites:
 A. Baccalaureate degree in Portuguese or equivalent.
 B. Reading knowledge of at least one other foreign language.
 C. Minimum GPA 3.3.

Requirements for Degree

- I. Entrance examination: Applicants may be required to have oral interview or produce tape to demonstrate language proficiency.
- II. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (699R).
- III. Thesis.
- IV. Examination: Comprehensive written examination as well as comprehensive oral examination over course work, reading list, and student's writing project.

MA Spanish

Spanish Language
 Spanish Literature
 Spanish Teaching

Admission and Entry

- I. Semesters of entry and application deadlines:
 Fall —February 15 (U.S. and international)
 Winter —June 30 (international)
 —September 21 (U.S.)
 Spring —September 21 (U.S. and international)
 Summer —September 21 (U.S. and international)
- II. Prerequisites:
 A. Baccalaureate degree in Spanish or equivalent.
 B. Reading knowledge of at least one other foreign language.
 C. Minimum GPA 3.3.

- III. Entrance examination: Applicants may be required to have oral interview or produce tape to demonstrate language proficiency.

Requirements for Degree

- I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (699R).
- II. Required courses: Span 601, 699R; three courses outside specialization (at least one from each of the other two areas of specialization); literature and teaching specialists must take Span 620.
- III. Three writing options: thesis, two-paper option, or project, all written in MLA or APA style.
- IV. Examinations: Comprehensive written examination as well as a comprehensive oral examination over course work, reading list, and student's writing project.

MA Language Acquisition (Portuguese)

See Language Acquisition section of this catalog.

Portuguese Graduate Courses

520. Advanced Portuguese Grammar. (3)

Application of contemporary grammatical concepts to problems in Portuguese grammar.

521. Romance Philology. (3)

Comparative study of the evolution of Latin into modern Romance languages. Cross-listed with Latin 621 and Port 521.

522. History of the Portuguese Language. (3)

Linguistic sources that contribute to formation of Portuguese.

529R. Special Topics in Portuguese Linguistics. (3)

Topics from semantics to dialectology to sociolinguistics.

539R. Luso-Brazilian Theatre Production. (3)

Theory and practice of dramatic performance. Includes participation in a play to be performed during the semester. Total Port 539R credit toward any degree may not exceed 3 hours.

542. Camões. (3)

549R. Special Topics in Portuguese Literature. (3)

552. Machado de Assis. (3)

Prerequisite: Port 441, 451, or equivalent.

553. Twentieth-Century Brazilian Literature. (3)

Prerequisite: Port 441, 451, or equivalent.

559R. Special Topics in Brazilian Literature. (3)

580R. Directed Research in Portuguese. (1-3)

Under direction of a faculty member, student designs and conducts research project that covers material not normally presented in regular course work. Research paper required. Total Port 580R credit toward any degree may not exceed 3 hours.

599R. Cooperative Education: Portuguese Internship. (1-3)

Prerequisite: Port 321 and instructor's consent.

For supervised internship credit on BYU Study Abroad programs only.

601A. Portuguese Linguistics and Research Methodology. (3)

601B. Portuguese Literary Theory and Research Methodology. (3)

629R. Seminar in Portuguese Linguistics. (3)

649R. Seminar in Portuguese Literature. (3)

659R. Seminar in Brazilian Literature. (3)

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

Spanish Graduate Courses

520. Advanced Spanish Grammar. (3)

Application of contemporary grammatical concepts to problems in Spanish grammar.

521. Romance Philology. (3)

Comparative study of evolution of Latin into modern Romance languages. Cross-listed with Latin 621 and Port 521.

522. History of the Spanish Language. (3)

Linguistic sources that contributed to formation of the Spanish language.

529R. Special Topics in Spanish Linguistics. (3)

Prerequisite: Span 520, 522.

Topics include semantics or dialectology or sociolinguistics.

539R. Hispanic Theatre Production. (3)

Prerequisite: director's consent.

Theory and practice of dramatic performance. Includes participation in play to be performed during semester. Total Span 539R credit toward any degree may not exceed 3 hours.

540. Medieval Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Spanish Literature from *El Cantar de Mio Cid* (1140) through *La Celestina* (1499).

543. Golden Age Literature. (3)

Prerequisite: Span 441 or equivalent.

Sixteenth- and seventeenth-century Spanish literature.

544. Don Quijote. (3)

Prerequisite: Span 441 or equivalent.

In-depth study of Cervantes's *El ingenioso hidalgo don Quijote de la Mancha*.

546. Nineteenth-Century Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Romanticism (1770s through 1870s) or the novels of Benito Perez Galdos and his contemporaries.

548. Twentieth-Century Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Genre (twentieth-century novel, drama, or poetry) or particular school (Generation of 1898, Generation of 1927, etc.)

549R. Special Topics in Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Specific topics in Spanish (peninsular) literature. Course content will vary each semester to offer optimum exposure to all areas of Spanish literature.

550. Pre-Columbian and Colonial Literature. (3)

Prerequisite: Span 451 or equivalent.

Indigenous literature (Maya, Nahuatl, etc.) and other texts written in Spanish colonial America through eighteenth century.

554. The Spanish American Novel. (3)

Prerequisite: Span 451 or equivalent.

Selected Spanish-American novelists such as Juan Rulfo, Gabriel García Marquez, Alejo Carpentier, Mario Vargas Llosa, etc.

555. Spanish American Poetry. (3)

Prerequisite: Span 451 or equivalent.

Selected Spanish-American poets, movements, and national traditions.

556. Latin American Drama. (3)

Prerequisite: Span 451 or equivalent.

Twentieth-century theatre from Spanish America and Brazil.

558. Hispanic American Short Story. (3)

Prerequisite: Span 451 or equivalent.

Introduction and development of an important literary genre in Spanish America, including works of Jorge Luis Borges, Julio Cortázar, Juan Rulfo, Gabriel García Marquez, etc.

559R. Special Topics in Spanish-American Literature. (3)

Prerequisite: Span 451 or equivalent.

Specific topics in Latin American literature. Course content will vary each term to offer optimum exposure to all areas of Latin American literature. Taught only during summer term.

577. Spanish Language Teaching Procedures. (3)

For public school teachers. Mastery of teaching skills specific to foreign language instruction. Lectures, demonstrations, practical experience.

580R. Directed Research in Spanish. (3)

Prerequisite: written proposal subject to departmental approval.

Individualized study. Under direction of a faculty member, student designs and conducts research project that covers material not normally presented in regular course work. Research paper required. Total Span 580R credit toward any degree may not exceed 3 hours.

599R. Cooperative Education: Spanish Internship. (1-3)

Prerequisite: Span 321 and instructor's consent.

For supervised internship credit on BYU Study Abroad programs only.

601A. Hispanic Linguistics and Research Methodology.

(3)

Basic research fields in linguistics (i.e., phonology, philology, syntax, psycholinguistics), how research differs in each area, and specific theoretical issues associated with each. Bibliographical and field research methods and techniques of reporting findings.

601B. Hispanic Literary Theory and Research Methodology. (3)

Introduction to literary theory, beginning with Aristotle's *Poetics* and continuing to present, but emphasizing major schools of literary theory in twentieth century. Bibliographical techniques and formats for critical essays.

601C. Research Designs in Hispanic Language Teaching. (3)

Designing and evaluating empirical research studies in foreign language learning and teaching methodology. Bibliographical techniques and methods of reporting findings.

620. Core Course in Hispanic Linguistics. (3)

Required of all MA literature and pedagogy specialists (optional for linguistics specialists who may not apply class to 30-hour requirement).

622. Hispanic Dialectology. (3)**625. Spanish Morphosyntax.** (3)

Linguistic study of morphological and syntactic structure of Spanish.

626. Spanish Phonetics and Phonology. (3)

Prerequisite: Span 326 or instructor's consent.

Systematic study of articulatory and acoustic Spanish phonetics and of structural and generative approaches to phonological description of Spanish.

629R. Seminar in Spanish Linguistics. (3)**649R. Seminar in Spanish Literature.** (3)**659R. Seminar in Spanish-American Literature.** (3)**671. Principles of Foreign Language Learning and Teaching.** (3)

Core course work for all MA candidates. Basic theories and principles of language learning and teaching. History, current research, practices, trends, and issues.

672. Media and Technology in Foreign Language Instruction. (3)

Applying modern technology and instructional media in teaching foreign languages.

673R. Directed Teaching of Spanish. (1-3)

Prerequisite: Span 326, 377, and graduate assistantship in department.

Supervised, practical experience in teaching Spanish at the college level.

674. Teaching Hispanic Culture. (3)

Methods of researching and teaching Hispanic culture.

676. Principles of Testing Foreign Language Skills. (3)

Test development and analysis for assessment of the four skills plus grammar and culture; survey and questionnaire construction.

678. Research Design in Foreign Language Instruction. (3)
Designing and evaluating empirical research studies in foreign language learning and teaching methodology.

679R. Seminar in Teaching Spanish. (3)
For experienced language teachers.

698R. Master's Project. (1–6)

Prerequisite: advisory chair's consent.

Candidates in nonthesis program may complete approved field project as their writing/research experience.

699R. Master's Thesis. (1–9)

Statistics

Chair: Leland J. Hendrix, 230 TMCB, 378-4505
Graduate Coordinator: Bruce J. Collings, 232 TMCB,
378-4870

Faculty/Specialties

Professors

Bryce, Gale Rex (1972) PhD, University of Kentucky, 1974. Industrial Quality Improvement.
Christensen, Howard B. (1967) PhD, North Carolina State University, Raleigh, 1975. Nonparametrics and Sample Design.

Collings, Bruce J. (1988) PhD, University of North Carolina, 1981. Actuarial Science, Biostatistics, Combinatorics, Computational Statistics, Design of Experiments, Simulation, Random Number Generation.

Hendrix, Leland J. (1967) PhD, Brigham Young University, 1967. Experimental Design, Computer Applications.

Hilton, H. Gill (1962) PhD, North Carolina State University, Raleigh, 1962. Experimental Design.
Rencher, Alvin C. (1963) PhD, Virginia Polytechnic Institute, 1968. Multivariate Analysis.

Scott, Del T. (1977) PhD, Pennsylvania State University, 1977. Statistical Computations, Categorical Data Analysis, Linear Models.

Tolley, H. Dennis (1983) PhD, University of North Carolina, 1974. Biostatistics, Actuarial Science, Large Data Sets.

Associate Professors

Beus, Gary B. (1967) PhD, Virginia Polytechnic Institute, 1968. Statistical Education, Quality Control.

Lawson, John S. (1986) PhD, Polytechnic Institute of New York, 1984. Industrial Statistics and Experimental Design.

Assistant Professors

Fellingham, Gilbert W. (1990) PhD, University of Washington, 1990. Biostatistics, Longitudinal Data Analysis, Large Data Sets, Missing Cells.

Grimshaw, Scott D. (1993) PhD, Texas A&M University, 1989. Industrial Quality Improvement, Time Series, Statistical Computing, Extreme Data Modeling.

Madrigal, Jose L. (1991) DPhil, Oxford, England, 1985. Operations Research, Industrial and Business Statistics, Biostatistics, Sampling Theory, Nonparametric Statistics.

Schaalje, G. Bruce (1992) PhD, North Carolina State University, 1988. Design and Analysis of Experiments, Population Modeling, Application of Statistics in Biology and Agriculture.

Graduate Degree and Program MS Statistics

Degree and Program Requirements

MS Statistics

This program is designed to prepare students for work in industry and government or PhD work in statistics.

Admission and Entry

I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 28 (international)
—May 15 (U.S.)
Winter —June 30 (international)
—July 15 (U.S.)
Spring —October 31 (international)
—December 15 (U.S.)
Summer —October 31 (international)
—December 15 (U.S.)

Students with a BS degree in statistics may enter any semester; others enter fall or spring.

B. Entrance examinations: GRE General Test.

Every international applicant whose native language is not English is required to submit TOEFL scores (minimum 580).

C. Minimum 3.3 overall undergraduate GPA.

II. Prerequisite:

- A. Stat 321, 322, 341, 411; 337 or 501; Math 343, 344; CS 130, 131; or equivalents to these.
B. Students whose native language is not English may be required to take one or more ESL classes, depending on the outcome of an interview with the department.

Requirements for Degree

I. Credit hours (30): Minimum 24 course work hours plus 6 thesis hours (Stat 699R).

II. Required courses: Stat 520, 521, 522, 531, 536, 591R, 592, 611, 636; one course from Stat 534, 537, 541, 545, 563, 621, 631, 662, 690R, Math 541, 542.

III. Minor (optional): Any approved minor.

IV. Thesis.

V. Examinations:

A. Methods qualifying examination (Stat 222, 322, 336, 337; or 322, 501, 502) and a theory qualifying examination (Stat 321, 322, 341, 520).

B. Oral examination on course work.

C. Oral defense of thesis.

Minor: Statistics

Master's level:

- I. 9 hours in statistics courses numbered 300 or above except 552 and 554. (A maximum of 3 hours of 300–400 level may apply toward a graduate minor.)

- II. Methods qualifying examination (Stat 222, 322, 336, 337; or 322, 501, 502).
- PhD level:
 - I. Stat 520, 521.
 - II. 9 additional hours from statistics courses 500 and above except Stat 501, 552, 554.
 - III. Methods qualifying examination (Stat 222, 322, 336, 337; or 322, 501, 502) and a theory qualifying examination (Stat 321, 322, 341, 520).

Statistics Graduate Courses

501. Statistics for Research Workers 1. (5) F, W, Sp

Prerequisite: Math 110 or equivalent. Recommended: concurrent registration in Stat 211, 322.

Probability, estimation, tests of hypotheses, regression, analysis of variance, and nonparametric methods. For natural or social science students.

502. Statistics for Research Workers 2. (5) W, Su

Prerequisite: Stat 501 or equivalent.

Analysis of covariance, multiple regression, linear models, design of experiments, and sampling. For natural or social science students.

520. Statistical Theory 1. (3) F

Prerequisite: Math 344, Stat 341, 342 and instructor's consent.

Axiomatic probability theory for discrete and continuous random variables; moment generating functions; conditional probability; stochastic independence; transformations; limiting distributions; stochastic convergence, central limit theorem.

521. Statistical Theory 2. (3) W

Prerequisite: Stat 520.

Sufficiency and completeness; point and interval estimation; hypothesis testing; Cramer-Rao inequality; some asymptotic results; introduction to Bayesian methods.

522. Theory of Linear Models. (3) F

Prerequisite: Stat 322, 520, Math 343.

Linear hypotheses, with application to regression and design.

531. Experimental Design. (3) W

Prerequisite: Stat 337.

Power for basic designs, hierarchical designs, change-over designs, confounding in symmetric and asymmetric designs, incomplete block designs, bioassay and response surface designs.

532. Quality Improvement for Engineering. (3) W on dem.

Prerequisite: Stat 361, Math 113.

Selected topics in statistical theory, analysis of variance, simple and multiple regression, response surface design and analysis, multilevel experimental designs, blocking designs, confounding.

534. Sampling. (3) F even yr.

Prerequisite: Stat 334; Stat 321 or 341 or instructor's consent.

Estimation in systematic, simple random, stratified, cluster, PPS sampling, and mixtures of these; ratio estimation; sample size determination and principles of sample allocation.

536. Regression Analysis. (3) F

Prerequisite: Stat 322; 336 or 501.

Multiple regression, introduction to model building and nonlinear estimation, examination of residuals, stepwise regression, subset selection procedures, biased estimation, and model validation.

537. Categorical Data Analysis. (3) W on dem.

Prerequisite: Stat 337 or 502, 536.

Analysis of multiway contingency tables with linear and log-linear models using maximum likelihood and minimum modified chi-square estimates as appropriate.

541. Advanced Probability. (3) W on dem.

Prerequisite: Stat 520 or instructor's consent.

Stochastic processes, Markov chains, generating functions, birth-death processes, random walks, the gambler's ruin problem, advanced combinatorial methods.

545. Stochastic Processes. (3) On dem.

Prerequisite: Stat 421 or 520.

Review of elementary probability; expectation, characteristic functions, limit theorems. Introductory random processes; definitions and properties, covariance and spectral density, time average, stationarity, ergodicity, linear system relations, mean square estimation, Markov processes.

552. Statistical Methods in Education 1. (3) F, W, Sp, Su

Prerequisite: Math 100 or equivalent.

Measures of central tendency, variability; correlation; simple linear regression; introduction to hypothesis testing and estimation. Computer applications. For graduate majors in education and related fields.

554. Statistical Methods in Education 2. (3) W, Su

Prerequisite: Stat 552.

Applications of analysis of variance and covariance, multiple regression, correlation, and nonparametric methods. Introduction to experimental design. For graduate majors in education and related fields.

563. Advanced Operations Research. (3) W on dem.

Prerequisite: Stat 463, 520.

Stochastic simulations; integer, nonlinear, and stochastic programming; developments in inventory theory; Markovian decision processes; insurance risks.

591R. Graduate Seminar in Statistics. (0)

592. Statistical Consulting. (1)

599R. Cooperative Education: Statistics. (1-9)

Prerequisite: department coordinator's consent.

On-the-job experience. Report required.

611. Multivariate Statistical Methods. (3) W

Prerequisite: Stat 322; 337 or 502.

Inference about mean vectors and covariance matrices; multivariate analysis of variance and regression; canonical correlation; discriminant analysis; principal component analysis; factor analysis.

621. Advanced Theory of Statistics. (3) On dem.

Prerequisite: Math 344, Stat 521.

Theory of estimation, testing hypotheses, multiple regression, and multivariate analysis.

631. Advanced Experimental Design. (3) F odd yr.

Prerequisite: Stat 321, 531.

Response surface methods, optimal designs, mixture designs, designs for nonlinear models, multi-response experiments, robust designs.

636. Advanced Statistical Methods. (3) F

Prerequisite: Stat 321, 322; 502 or 531; 536.

Analysis of variance with unequal subclass frequencies, including missing cells; analysis of covariance; orthogonal polynomials; multiple comparisons and related topics.

662. Advanced Industrial Statistics and Reliability. (3)

On dem.

Prerequisite: Stat 321, 462; Math 215 or 344.

Sequential sampling, tolerance limits, life testing, and reliability.

690R. Advanced Special Topics. (3) F, W, Sp, Su

Prerequisite: instructor's consent.

695R. Readings in Statistics. (1-3) F, W, Sp, Su

Prerequisite: department's consent.

699R. Master's Thesis. (1-6) F, W, Sp, Su

Prerequisite: department's consent.

Technology Education and Construction Management

Chair: Garth A. Hill, 230 SNLB, 378-6494

Graduate Coordinator: Jerry D. Grover, 230 SNLB,
378-2023

Faculty/Specialties

Professors

Grover, Jerry D. (1968) EdD, Brigham Young University, 1968. Automotive Technology, Student Teaching. Nish, Dale L. (1967) EdD, Washington State University, 1967. Woods.

Associate Professors

Gheen, W. Lloyd (1978) EdD, Texas A&M University, 1970. Plastics, Teacher Education. Gonzales, Ronald F. (1977) PhD, Purdue University, 1982. Automotive Technology, Electronics. Hill, Garth A. (1972) PhD, Colorado State University, 1979. Metals, Teacher Education. Martin, Loren (1982) EdD, Utah State University, 1973. Construction, Teacher Education. Newitt, Jay S. (1976) PhD, Colorado State University, 1980. Construction.

Assistant Professors

Christensen, Kip W. (1988) PhD, Colorado State University, 1991. Construction, Woods, Teacher Education.

Weidman, Brent H. (1988) PhD, Colorado State University, 1992. Construction Management.

Graduate Degree and Program

MS Technology Education

Graduate programs in the Department of Technology Education and Construction Management are not designed to complete teacher certification or endorsement requirements, but rather to prepare vocational and industrial leaders with the necessary knowledge and skills for leadership in teaching, supervision, and management in schools and industry.

Degree and Program Requirements

The MS degree programs in technology education provide two options for completing graduation requirements. The student may elect the summer residency program or the full-time, on-campus program. The summer residency program consists of a minimum of three to four full-time summers on campus, with intervening approved field experiences during fall and winter semesters.

MS Project Technology Education

Admission and Entry

I. Semesters of entry and application deadlines:

Fall —February 28 (international)

—May 15 (U.S.)

Winter —June 30 (international)

—September 15 (U.S.)

Spring —October 31 (international)

—February 20 (U.S.)

Summer —December 31 (international)

—April 15 (U.S.)

II. Prerequisite: A valid teaching certificate or a minimum of 30 semester hours in acceptable technology or vocational education courses.

Requirements for Degree

I. Credit hours: Minimum 34 hours, including a field project (TecE 698R).

II. Required courses:

A. History and philosophy: TecE 610 or 615; 690.

B. Curriculum: TecE 625, 645; or IS 560 or 620.

C. Research: IS 672 or ELdr 671; TecE 694R, 698R.

III. Electives: At least 8 in technology education. Remaining hours may be from business, construction management, educational leadership, counseling, secondary curriculum, or technical depth.

IV. Project.

V. Examination: Written and oral defense of course work.

MS Thesis Technology Education**Admission and Entry**

- I. Semesters of entry and application deadlines:
- | | |
|--------|------------------------------|
| Fall | —February 28 (international) |
| | —May 15 (U.S.) |
| Winter | —June 30 (international) |
| | —September 15 (U.S.) |
| Spring | —October 31 (international) |
| | —February 20 (U.S.) |
| Summer | —December 31 (international) |
| | —April 15 (U.S.) |
- II. Prerequisite: 30 hours of acceptable undergraduate technology or vocational education courses, or a minimum of six years of vocational experience.

Requirements for Degree

- I. Credit hours (34): Minimum 28 course work hours plus 6 thesis hours (TecE 699R).
- II. Required courses:
- A. History and philosophy: TecE 610 or 615, 690.
 - B. Curriculum: Elective.
 - C. Management: TecE 535, 640.
 - D. Research: TecE 694R, 699R, IS 672 or ELdr 671, Stat 501 or 552.
- III. Electives: At least 6 hours in technology education. Remaining hours may be from business, construction management, educational leadership, educational psychology, counseling, technical depth, or as approved by committee.
- IV. Thesis.
- V. Examination: Oral defense of course work and thesis.

Technology Education Graduate Courses**505. Technology for the Elementary School. (2) Sp, Su alt. yr.**

Basic concepts and activities needed to prepare elementary students to cope with their technological society.

535. Industrial/Vocational Safety Program

Development. (2) Sp, Su alt. yr.

Identifying and implementing programs for safety and facilities management that comply with state and national legislation.

593R. Workshop in Industrial/Technology Education. (1-3)

Reviewing and participating in current industrial and technological advances. Limited to 3 credit hours maximum.

610. History and Legislation of Vocational and Technology Programs. (2) Sp, Su alt. yr.

Historical basis of today's vocational/technological programs with emphasis on past and current funding.

615. Philosophical Basis of Technological Programs. (2) Sp, Su alt. yr.

Rationale for vocational and technology programs, including current and future trends and social, economic, and environmental impacts.

625. Instructional Management for Vocational and Technology Courses. (2) Sp, Su alt. yr.

Identifying, developing, and implementing instructional strategies unique to vocational-technical programs.

630. Adult Vocational and Technology Programs. (2) Sp, Su alt. yr.

Identifying, developing, and implementing relevant applied technology training programs.

635. Facility Design for Vocational and Technology Programs. (2) Sp, Su alt. yr.

Developing instructional facilities and educational specifications for vocational and technology laboratories.

640. Coordination and Supervision of Vocational and Technology Programs. (2) Sp, Su alt. yr.

Methods, regulations, and policies used in supervising vocational and technical education programs.

645. Visual and Graphic Presentations in Vocational and Technology Programs. (2) Sp, Su alt. yr.

Identifying, developing, and using visual and graphic material for vocational and technology programs.

690R. Seminar. (1)

Review of latest research and developments in technology and vocational education.

694R. Readings and Conference. (1-3)

Limited to a maximum of 3 credit hours.

695R. Advanced Technological Processes. (1-3)

Developing and implementing solutions to special problems; advanced skills and concepts in traditional and emerging technology areas.

698R. Master's Project. (1-3)**699R. Master's Thesis. (1-6)****Theatre and Film**

Chair: Eric Fielding, D-581 HFAC, 378-7471

Graduate Coordinator: Marion J. Bentley, F-455 HFAC, 378-2122

Faculty/Specialties**Professors**

Bentley, Marion J. (1971) PhD, University of Utah, 1968.

Directing, Acting, Dialects, Theatre History.

Fielding, Eric (1992) MFA, Goodman School of Drama, Art Institute of Chicago, 1976. Set Design, Lighting Design, Theatre Management.

Metten, Charles L. (1962) PhD, University of Iowa, 1960.

Film History, Theory and Criticism, Directing, Acting.

Oaks, Harold R. (1970) PhD, University of Minnesota, Minneapolis, 1964. Child Drama, Children's Theatre, Puppetry, Directing.

Pope, Karl T. (1966) PhD, Wayne State University, 1966.

Set and Lighting Design, Technical Theatre.

Whitman, Charles W. (1965) PhD, University of Minnesota, Minneapolis, 1967. Music Dance Theatre, Acting, Directing, Playwriting.

Associate Professors

- Jenkins, Jean R. (1967) MA, Brigham Young University, 1966. Interpretation, Voice and Speech, Storytelling.
Nelson, George D. (1990) MFA, University of Washington, 1979. Secondary Education, Child Drama.
Nelson, Robert A. (1977) PhD, University of Utah, 1976. Acting, Directing, Theatre History, Dramatic Theory and Criticism.
Scanlon, Rory R. (1984) MFA, University of Illinois, 1984. Set and Costume Design, Costume History, Lighting Design.
Swenson, Janet L. (1974) MFA, University of Utah, 1992. Costume Design, Costume History, Makeup.

Assistant Professors

- Croslan, Ivan A. (1971) MA, Brigham Young University, 1965. Acting, Directing.
Heiner, Barta (1988) MFA, American Conservatory Theatre, 1977. Acting, Directing.
Morgan, David E. (1991) MFA, National Theatre Conservatory, 1990. Acting, Directing.
Samuelson, Eric (1992) PhD, Indiana University, 1991. History, Theory, Criticism.
Scheerer, David F. (1989) MFA, Brigham Young University, 1986. Film Production.
Sloven, Tim. (1989) PhD, University of Michigan, 1993. Playwriting, Screenwriting.
Swenson, Sharon (1987) PhD, University of Utah, 1993. Film History, Theory, Criticism.
Walker, Oscar Lee (1969) MIE, Brigham Young University, 1975. Technical Theatre, Stage Management.

Graduate Degrees and Programs

- MA, PhD Theatre and Film
MFA Theatre Design and Technology

Degree and Program Requirements

MA Theatre and Film

Areas of emphasis include theatre, film, child drama, history, theory, and criticism.

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
Summer —December 31 (international)
—February 15 (U.S.)
 - B. Entrance examination: GRE General Test.
 - C. Samples of written work, demonstrating the capacity to function at an acceptable graduate student entry level.
- II. Prerequisite: Acceptable undergraduate background in theatre arts or film.

Requirements for Degree

- I. Credit hours (32): Minimum 26 course work hours plus 6 thesis hours (ThF 699R). Minimum of 20 hours must be in theatre/film or theatre/film-related courses.

- II. Required courses: ThF 690; 9 hours in graduate-level history, theory, and criticism—either 3 hours in film and 6 in theatre, or 6 hours in film and 3 in theatre, depending upon area of emphasis.

- III. Minor (optional): Any approved minor.

- IV. At least one significant production experience, determined in consultation with advisory committee. Evaluation will occur immediately after the production.

- V. Thesis: Thesis must make genuine contribution to body of knowledge and meet highest academic standards. (Departmental style guides are MLA and Turabian.) Three kinds of thesis research will be accepted: (1) scholarly analysis of theatre, film, or television history, theory, or criticism; (2) research and strong creative achievement in theatre or film; or (3) measurement studies.

- VI. Final examinations:

- A. Comprehensive written examination.
- B. Comprehensive oral examination.
- C. Oral defense of thesis.

MFA Theatre Design and Technology

Admission and Entry

- I. Application requirements:
 - A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
 - B. Entrance examination: GRE General Test.
 - C. Résumé and portfolio.
 - D. Interview with area committee.
- II. Prerequisite: The following courses or their equivalents: ThF 116, 117, 121, 123, 127R, 140, 141R, 143R, 200, 201, 220, 361, 461; Art 108, 422, 433R; CITx 145, 245, 345.

Requirements for Degree

- I. Credit hours: Minimum 60 course work hours, including 6 project hours (ThF 698R).
- II. Required courses: ThF 520, 544R, 595R, 599R, 600, 601, 662R, 668, 674R, 690, 698R, 731, 732, 797R.
- III. Electives: 15 hours selected from the following in consultation with advisory committee: ThF 519, 541R, 542R, 544R, 545R, 562, 670, 678, 697R; Art 600R, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610; CITx 545.
- IV. Off-campus internship (ThF 599R).
- V. Project (minimum 6 hours; ThF 698R): Design and supervision of scenery, lighting, or costumes for at least one full-length production. Must be reported in thesis form and accepted by area committee.
- VI. Final examinations:
 - A. Comprehensive written examination.
 - B. Oral defense of project.

PhD Theatre and Film

Areas of emphasis include theatre, film, child drama, history, theory, and criticism.

Admission and Entry

- I. Application requirements:

- A. Semesters of entry and application deadlines:
Fall —February 15 (U.S. and international)
Summer —December 31 (international)
—February 15 (U.S.)
- B. Entrance examination: GRE General Test; scores subject to review.
- C. Samples of written work demonstrating capacity to function at acceptable doctoral student entry level.
- II. Prerequisite: Acceptable master's degree in theatre or film.

Requirements for Degree

- I. Credit hours beyond bachelor's degree (78): Minimum of 45 hours in theatre and film; 15 hours in approved minor; 18 dissertation hours (ThF 799R). (Language/Skill requirement not included here.)
- II. Required courses: ThF 690; 15 hours in graduate-level history, theory, and criticism—either 6 hours in film and 9 in theatre, or 9 hours in film and 6 in theatre, depending upon area of emphasis.
- III. Language/Skill Requirement.
 - A. Option 1: One language, in depth (reading and speaking ability). Specific language to be determined in consultation with advisory committee. Demonstrate competency through completion (grade B or better) of 300-level literature and culture course, taught in the language, or equivalent. Or, demonstrate competency by means of special examination, in consultation with advisory committee, that will test ability to translate literature in field competently and communicate orally in the language.
 - B. Option 2: Two languages (reading ability). Specific languages to be determined in consultation with advisory committee. Demonstrate competency through passing of two-semester intensive reading course in the language, or equivalent.
 - C. Option 3: One language (reading ability) and one skill subject. Specific language and skill subject—which must be outside the department—to be determined in consultation with advisory committee. Demonstrate competency in language through passing of two-semester intensive reading course in the language, or equivalent. Demonstrate competency in skill subject through completion (grade B or better) of 9 semester hours of graduate-level course work, as approved by advisory committee.
- IV. At least one significant production experience, as determined in consultation with advisory committee. Evaluation will occur immediately after the production.
- V. Dissertation: Dissertation must make genuine contribution to body of knowledge and meet highest academic standards. (Departmental style guides are MLA and Turabian.) Three kinds of dissertation research will be accepted: (1) scholarly analysis of theatre, film, or television history, theory, or criticism; (2) research and strong creative achievement in stage or film; and (3) measurement studies.

VI. Final examinations:

- A. Comprehensive written examination.
- B. Comprehensive oral examination.
- C. Oral defense of dissertation.

Theatre and Film Graduate Courses

- 516R. Theatre and Film Instruction.** (1–3) Alt. term.
Prerequisite: instructor's consent.
Master class for developing teaching methods and techniques.
- 519R. Stage Management 2.** (1–3) Alt. term.
Prerequisite: ThF 319 or equivalent.
Advanced principles, techniques, and practice. Production stage managers chosen from this course.
- 520. Scenic Design 2.** (3)
Prerequisite: ThF 140, 220, or instructor's consent.
Intermediate theory and practice of scenic design for the stage.
- 522R. Auditions and the Business.** (3)
Prerequisite: ThF 124R, 323R, 324R.
Auditions, cold reading, resumés, and the business end of acting, music, and dance for the professional performer.
- 523R. Acting: Recital.** (2)
Prerequisite: ThF 124R, 323R, 324R.
Twenty-five- to thirty-minute performance of cuttings from varied genres.
- 524R. Acting: Advanced Performance.** (3)
Prerequisite: ThF 124R, 323R, 324R.
Performance option: performance and written analysis of approved role in a major production. Teaching option: assistance in acting classes and weekly seminar.
- 526. Sound Design 2.** (2)
Prerequisite: ThF 220, 326, or equivalent.
Theory, practice, and methodology of studio sound recording, reinforcement, and mixing.
- 527. Storytelling.** (2) Alt. sem., Alt. term
Theory, technique, and practice.
- 540R. Workshop 2: Acting.** (1–6)
Prerequisite: instructor's consent.
Advanced experience in production: acting.
- 541. Set Construction 3.** (3)
Advanced experience in production: construction.
- 542R. Theatre Production 3.** (1–3)
Prerequisite: 143R, 343R, or equivalent.
Advanced experience in production: technical crew.
- 543R. Workshop 2: Directing.** (1–6)
Prerequisite: instructor's consent.
Advanced experience in production: directing.
- 544R. Workshop: Design.** (1–6)
Prerequisite: instructor's consent.
Advanced experience in production: design.
- 545R. Costume Construction 3.** (1–6)
Prerequisite: ThF 543R, 544R, or instructor's consent.
Special construction: armor, masks, etc.

552R. Creative Dramatics and Improvisation. (3) W, Alt. Su
Informal or improvised dramatic techniques with children, adolescents, and/or adults.

562. Costume Design 3. (3) W, Alt. term
Prerequisite: ThF 220, 362, 462, 544R, 595R, or instructor's consent.

Advanced theory and practice in costume design for stage and screen.

572R. Theatre for Children. (2)

Theories, techniques, and experience in creating formal drama for the child and youth audience.

578R. Advanced Playwriting. (2–6) F, W, Alt. term
Prerequisite: ThF 378R.

Seminar in playwriting.

579R. Playwright's, Director's, Actor's Workshop. (4)
Prerequisite: by audition only.

Group approach to nurturing new work through script study, improvisation, and staged readings.

581. Art Direction. (3) Alt. yr.

Prerequisite: ThF 280 or equivalent; instructor's consent.

Fundamentals of motion picture/television art direction and design.

584. Film Sound. (3)

Prerequisite: ThF 280R or equivalent; instructor's consent.

Motion picture sound recording and theory.

585. Screenwriting 3. (3)

Prerequisite: ThF 380, 485, or equivalent; full acceptance into film BFA program.

Theory and technique of writing feature-length dramatic screenplays.

587R. Film Genres. (3).

Prerequisite: ThF 202, 203, 489R, and full acceptance into film BA or BFA program.

Intensive study of major film genres: western, musical, or horror.

588R. Motion Picture Directors. (3) W

Prerequisite: ThF 202, 203.

In-depth study of representative body of motion pictures by one major film director such as John Ford, Howard Hawks, Ingmar Bergman, or Woody Allen.

595R. Workshop 2: Special Projects. (1–6)

Advanced experience in production: special projects.

599R. Cooperative Education. (1–9)

Prerequisite: instructor's consent.

Off-campus experience in stage, film, or television writing, directing, acting, designing, or managing.

600. Advanced History 1: Theatre. (3) Alt. F, Alt. Sp
Prerequisite: ThF 200, 201.

Primitive and classical theatre through seventeenth century.

601. Advanced History 2: Theatre. (3) Alt. W, Alt. Su
Prerequisite: ThF 200, 201.

Theatre, eighteenth century to present.

644. Advanced Scenic Design. (3)

Prerequisite: ThF 140, 220, 340R, 520, or equivalent.
Advanced theory and practice in set design for stage.

660R. Advanced Voice and Interpretation. (3)

Prerequisite: ThF 121, 122, 123, 325R.

Continuation of ThF 325R. Polishing vocal and interpretative skills through performances.

662R. Seminar in the Theory and History of Theatrical Costuming. (3) F, Alt. Su
Prerequisite: ThF 220, 295R, 362, 544R, 562, 595R, or equivalent.

Major movements and evolution of costuming theory, providing research and design experience.

664. Theatre Management 1. (2)

Theory and practice, including play selection, budget, and promotion.

665. Theatre Management 2. (2)

Theory and practice, including box office, theatre plant, and personnel.

668R. Special Studies in Theatre, Film, or Television. (1–3)

Supervised research in selected historical, theoretical, or critical problems.

670. Advanced Set Construction. (3)

Prerequisite: ThF 140, 340, 541, or equivalent.

Special problems in scenery construction and rigging.

671R. Advanced Directing. (3) F, Alt. term

Prerequisite: ThF 200, 201, 361, 461, or equivalent.

Theories and techniques of directing for the stage through directing projects for public presentation.

674R. Projects in Theatre and Film. (1–4)

Supervised applied theory in playwriting/screenwriting, directing, acting, design, criticism, stagecraft.

678. Advanced Stage Lighting. (3)

Prerequisite: ThF 142, 220, 321, or equivalent.

Theory and techniques of theatrical lighting.

680R. Advanced Film Production. (5)

Prerequisite: ThF 280, 285, 380, 485, 490, or equivalent; instructor's consent.

Advanced 16-mm filmmaking.

685R. Screenwriting 4. (3)

Prerequisite: ThF 490, 585, and instructor's consent.

Advanced practical experience in screenwriting.

689. Motion Picture History. (3)

Worldwide survey of advanced motion picture history.

690. Introduction to Graduate Studies in Theatre and Film. (3) F, Alt. Su
Introductory seminar required of all graduate students during first semester or term that class is offered.

697R. Seminar and Production: Special Theatre Forms. (2–3)

Prerequisite: instructor's consent.

Theory and practice directing in special forms: readers theatre, avant-garde, etc.

698R. Master's Project. (1–6)

699R. Master's Thesis. (1-9)

700R. Master Seminar. (3) Annually
Selected topics.

731. Dramatic Theory and Criticism 1. (3) Alt. F, Alt. Sp
Development from beginning to nineteenth century.

732. Dramatic Theory and Criticism 2. (3) Alt. W, Alt. Su
Development from nineteenth century to present.

772R. Seminar in Child Drama. (3)

Prerequisite: ThF 552R, 572R, or instructor's consent.
Advanced theory and research in drama and theatre with and for children.

788R. Symposium for Filmmakers. (3)

Prerequisite: ThF 280, 490; 680R or concurrent registration; instructor's consent.

Symposium to stimulate and enhance perception and understanding of motion picture industry and its historical, contemporary, and social context.

797R. Research. (Arr.)**799R. Doctoral Dissertation. (1-18)**

Zoology

Chair: H. Duane Smith, 575 WIDB, 378-2006

Graduate Coordinator: Ferron L. Andersen, 597 WIDB,
378-4145

Faculty/Specialties

Professors

Andersen, Ferron L. (1967) PhD, Utah State University, 1963. Parasitology.

Barnes, James R. (1969) PhD, Oregon State University, 1972. Aquatic Ecology.

Baumann, Richard W. (1975) PhD, University of Utah, 1970. Aquatic Insect Systematics, Biology, and Distribution.

Black, Hal L. (1975) PhD, University of New Mexico, 1972. Ecology, Mammalogy.

Booth, Gary M. (1972) PhD, University of California, Riverside, 1969. Insect Physiology, Toxicology.

Bradshaw, William S. (1970) PhD, University of Illinois, 1968. Developmental Biology.

Farmer, James L. (1969) PhD, Brown University, 1966. Molecular Genetics.

Heckmann, Richard A. (1972) PhD, Montana State University, 1970. Fish Diseases, Parasitology.

Heninger, Richard W., Associate Dean (1966) PhD, Oklahoma State University, 1961. Physiology, Endocrinology.

Jeffery, Duane E. (1969) PhD, University of California, Berkeley, 1972. Ecological and Evolutionary Genetics of *Drosophila* and Related Organisms.

Jorgensen, Clive D. (1960) PhD, Oregon State University, 1964. Entomology, Ecology, Insect Pest Control.

Rhees, Reuben Ward (1973) PhD, Colorado State University, 1971. Neuroendocrinology, Physiology.

Seegmiller, Robert E. (1972) PhD, McGill University, 1970. Developmental Biology, Teratology.

Sites, Jack W., Jr. (1982) PhD, Texas A&M University, 1980. Evolutionary Genetics, Vertebrate Biology.

Smith, H. Duane (1969) PhD, University of Illinois, 1969. Mammalian Ecology, Wildlife Management.

Tolman, Richard R. (1982) PhD, Oregon State University, 1969. Science Education.

Van De Graaff, Kent M. (1975) PhD, Northern Arizona University, 1973. Comparative Anatomy.

White, Clayton M. (1970) PhD, University of Utah, 1968. Raptor Biology, Ornithology, Avian Systematics and Evolution.

Winder, William W. (1982) PhD, Brigham Young University, 1971. Exercise Physiology and Endocrinology.

Associate Professors

Braithwaite, Lee F. (1964) PhD, Brigham Young University, 1970. Marine Biology.

Maurer, Brian A. (1986) PhD, University of Arizona, 1984. Avian Population and Community Ecology, Ecological Theory, Macroecology.

Shiozawa, Dennis Kenji (1978) PhD, University of Minnesota, St. Paul, 1978. Aquatic Ecology, Limnology, Ichthyology.

Smith, Lamont W. (1970) PhD, West Virginia University, 1970. Reproductive Physiology of Domestic Animals.

Whitehead, Armand T. (1969) PhD, University of California, Berkeley, 1969. Entomology, Insect Physiology.

Assistant Professors

Bell, John D. (1990) PhD, University of California, San Diego, 1987. Pharmacology, Membrane Physiology.

Evans, R. Paul (1987) PhD, Medical College of Virginia, 1983. Molecular Biology.

Judd, Allan M. (1991) PhD, West Virginia University, 1981. Physiology, Neuroendocrinology.

Rogers, Duke S. (1989) PhD, University of California, Berkeley, 1986. Phylogenetic Systematics—Mammalogy.

Graduate Degrees and Programs

MS: Biological Science Education

MS, PhD: Molecular Biology (Interdepartmental Program)

MS, PhD: Zoology

Areas of Specialization

MS: Biological Science Education, Anatomy, Cell Biology, Conservation Biology, Ecology, Entomology, Genetics, Physiology, Systematics, Wildlife and Range Resources, Zoology

PhD: Anatomy, Cell Biology, Conservation Biology, Ecology, Entomology, Genetics, Physiology, Systematics, Wildlife and Range Resources, Zoology

Degree and Program Requirements*

All graduate programs in zoology have the same admission and entry requirements.

Admission and Entry

I. Application requirements:

A. Semesters of entry and application deadlines:
Fall —February 1 (U.S. and international)

- B. Entrance examination: GRE General Test. Scores must be submitted with application to be considered for regular admission. Foreign students whose native language is not English must submit TOEFL scores.
- II. Applicants are encouraged to communicate with Zoology Department (575 WIDB) for further information.

*Obtain a copy of the Graduate Student Handbook from the department office (575 WIDB).

MS Biological Science Education

Admission and Entry

See above application requirements.

Requirements for Degree

- I. Credit hours (30): Minimum 24 approved course work hours plus 6 project hours (Zool 698R).
- II. Required courses: Zool 503, Zool 696R (1 hour).
- III. Project.
- IV. Examinations:
 - A. Oral examination on course work.
 - B. Oral defense of project.

MS Molecular Biology (Interdepartmental Program)

Admission and Entry

See above application requirements. Application should be made to the Molecular Biology Program, designating zoology as the specialization of study. See Molecular Biology section of this catalog.

Requirements for Degree

- I. Requirements noted in items I, II, III, and IV for the MS in zoology apply.
- II. Additional required courses: For minimum degree requirements see Molecular Biology section of this catalog.

MS Zoology

Admission and Entry

See above application requirements.

Requirements for Degree

- I. Credit hours (30): Minimum 24 hours plus 6 thesis hours (Zool 699R).
- II. Required courses: Zool 503, 504, 696R (1 hour).
- III. Thesis: Standard university thesis format or journal publication format.
- IV. Examinations:
 - A. Oral defense of research.
 - B. Oral examination on course work.
 - C. Oral defense of thesis.

PhD Molecular Biology (Interdepartmental Program)

Admission and Entry

See above application requirements. Application should be made to the Molecular Biology Program, designating zoology as the specialization of study. See Molecular Biology section of this catalog.

Requirements for Degree

- I. Requirements noted in items I, II, III, IV, and V for the PhD in zoology apply.

- II. Additional required courses: For minimum degree requirements, see Molecular Biology section of this catalog.
- III. Minor (optional): Approved minor in biological or physical science.

PhD Zoology

Admission and Entry

- I. Application requirements: See above.
- II. Prerequisite: Master's degree in zoology or equivalent.

Requirements for Degree

- I. Credit hours: 42 hours including 18 hours of dissertation (Zool 799R).
- II. Required courses: Zool 503, 504, 696R (1 hour).
- III. Skill requirement: Includes 21 hours in skill subject area of foreign languages, mathematics, statistics, and/or computer science. Consult department for details.
- IV. Dissertation: Standard university dissertation format or journal publication format.
- V. Examinations:
 - A. Oral defense of research.
 - B. Written and oral examinations on course work.
 - C. Oral defense of dissertation.

Program and Degree Resources

Benmore Experiment Station
Desert Range Experiment Station
Dugway Proving Grounds
Ephraim Experiment Station
Friday Harbor (Washington) Laboratories
Hopkins Marine Station
Lytle Preserve Ranch
M. L. Bean Life Science Museum
Skaggs Ranch
Spanish Fork Farm

Zoology Graduate Courses

503. Research Orientation. (1) F

Departmental graduate procedures; techniques used in researching zoological literature. Students must register for this class the first fall semester of their graduate studies.

504. Research Methodology. (1) W

Prerequisite: Zool 503.

Techniques of zoological research and manuscript preparation.

515R. Science In-Service. (1-5)

In-service course for science teachers. Subjects that may be offered include:

- Advanced Topics Science In-Service
- Ecology Science In-Service
- Genetics Science In-Service
- Evolution Science In-Service
- Botany Science In-Service
- Meterology Science In-Service

526. (Zool-Botny) Cell Biology. (3) F

Prerequisite: introductory course in biochemistry.
Molecular physiology and ultrastructure of cells, emphasizing eukaryotic organisms.

531. Insect Physiology. (4) Alt. yr.

Prerequisite: Zool 331; Chem 152 or 351.
Internal anatomy and physiology of insects.

532. Insect Classification. (4) Alt. yr.

Prerequisite: Zool 331. Recommended: Zool 330.

Insect systematics, emphasizing external morphology, natural history, evolution, distribution and phylogeny. Insect collection required.

536. Comparative Toxicology. (3)

Prerequisite: general biology and a course in organic chemistry.

Modes of action and biological transformations of pesticides in living animals, plants, and the environment, emphasizing techniques.

537. Aquatic Entomology. (2) F

Recommended: Zool 331.

Morphology, classification, biology, and functional ecology of aquatic insects.

538. Immature Insects. (2)

Recommended: Zool 331.

Morphology, systematics, and biology of immature insects.

540. Zoogeography. (2) F Alt. yr.

Prerequisite: Zool 204.

Methods for analyzing distribution of animals; review of distribution of major animal groups with some emphasis on island biogeography as a critical principle.

546. World Bird Families. (4)

Recommended: Zool 446.

Distribution, composition, and characteristics of the bird families of the world—museum specimens used.

547. Raptor Biology. (2-4)

Recommended: Zool 446.

Biology and conservation of the major groups of bird predators, with some study of museum specimens.

549R. Advanced Topics in Zoology. (1-4) On dem.

Prerequisite: instructor's consent.

—Subjects that may be offered include:

- Anatomical Preparations
- Histological Techniques
- Diseases of Fish
- Advanced Mammalogy
- Advanced Ornithology
- Wildlife Diseases

556. Limnology. (4)

Prerequisite: Zool 350.

Biotic and physical-chemical properties of lakes and streams. Saturday field trips required.

559R. Advanced Topics in Ecology and Systematics.

(1-4) On dem.

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Advanced Ecology
- Tropical Biology
- Evolutionary Biology

560. Advanced Human Anatomy. (2) F

Prerequisite: Zool 260 or 363 and instructor's consent.

Anatomical facts of clinical significance, with opportunity to dissect cadavers.

565. Endocrinology. (3) W

Prerequisite: Zool 460 or equivalent.

Study of mammalian hormones.

566. Experimental Endocrinology. (2) W

Prerequisite: Zool 565 or concurrent registration.

Techniques used in research.

569R. Advanced Topics in Entomology. (1-4) On dem.

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Insect Taxonomy
- Insect Ecology
- Insect Physiology
- Acarology

572. Gene Regulation. (3) F alt. yr.

Prerequisite: Zool 342.

Molecular basis of gene regulation in eukaryotic cells.

Emphasis on transcriptional and post-transcriptional controls in nuclear and organellar genomes of animals and plants.

579R. Advanced Topics in Genetics. (1-4) On dem.

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Molecular Evolution
- Teratology Techniques

584. (Zool-Psych) Neurophysiology. (3)

Prerequisite: Zool 460 or equivalent.

Physiology of nerve cells and neuronal interactions.

585. Developmental Biology. (3)

Prerequisite: Botny-McBio-Zool 341, 342.

Cellular and biochemical mechanisms that achieve differentiation in the developing embryo.

589R. Advanced Topics in Physiology. (1-4) On dem.

Prerequisite: instructor's consent.

- Reproduction and Neuroendocrinology
- Renal and Gastrointestinal Physiology
- Cardiovascular and Respiratory Physiology

591R. Special Problems in Zoology. (1-2)

Prerequisite: instructor's consent.

602. Theoretical Ecology. (4)

Theoretical foundations of evolutionary ecology; emphasizes understanding ecological theory.

603. Ecological Data Analysis. (4)

Prerequisite: Stat 501.

Practical quantitative methods necessary to analyze ecological data. Use of computer software for statistical analysis.

604. Phylogenetic Systematics. (3)

Theoretical foundations of modern systematics; includes methods of phylogenetic inference.

605. Molecular Methods in Systematics and Population Biology. (5)

Introduction to current molecular methods in systematics and population biology; emphasis on laboratory techniques in isozyme analysis.

663R. Experimental Physiology. (2)

Prerequisite: Zool 460.

Topics vary. See current class schedule.

696R. Graduate Seminar. (0.5)

Topics vary. See Class Schedule.

698R. Master's Project. (Arr.)

699R. Master's Thesis. (Arr.)

799R. Doctoral Dissertation. (Arr.)

Campus Facilities and Services

Cultural and Recreational Resources

One of the cultural centers of the intermountain region, Brigham Young University offers a wealth of opportunities for students and community members interested in the cultural arts. It is the home of four major museums—the Monte L. Bean Life Science Museum, the Earth Science Museum, the Museum of Peoples and Cultures, and the new Museum of Art.

In addition to maintaining a variety of theatres, concert halls, and art galleries for study and performance in drama, music, dance, and the visual arts, BYU sponsors performing arts series that bring to the campus some of the world's most acclaimed musicians. Other offerings include the Honors Program cultural arts series and the International Cinema, which shows foreign films weekly. Moreover, BYU is associated with a professional motion picture studio and an educational television station and FM radio station that broadcast a wide spectrum of programs.

Of prime importance are the general forums and devotional assemblies, which draw together the entire campus to be addressed by prominent Church and national figures. BYUSA-sponsored lectures and college- and department-sponsored lectures by noted scholars also enhance learning.

BYU has an exceptional athletic program, which has achieved national prominence in recent years in men's basketball, football, and golf and women's volleyball and tennis. The Marriott Center, the second largest on-campus indoor arena in the nation, seats 23,000; and the football stadium seats 65,000. Opportunities abound for the participant as well as the spectator through BYU's large intramural program, in which thousands of students participate in more than 60 different events. BYU also has an extensive extramural program in sports such as lacrosse, softball, and soccer.

Situated at the foot of the Wasatch Mountains, BYU offers students a wealth of outdoor recreational opportunities, including some of the best skiing and hiking in the world. Furthermore, Utah's vast desert wilderness and canyon country begins just a few hours from the campus.

Forty-five miles north of Provo is Salt Lake City, home of numerous theatrical, dance, and musical groups, among them Ballet West and the Utah Symphony.

Campus Services of Interest to Graduate Students

Most specific services for graduate students are provided at the departmental level; therefore, the following items present only the most general information. Information related to specific interests, such as employment in a particular department, is available in individual departments.

Campus Privileges for Graduate Students

Graduate students who are registered for at least 2 hours per semester or 1 hour per term receive a university activity card (ID card) and are eligible for all on-campus privileges afforded students who are registered full-time, i.e., eligibility for on-campus employment, student housing, student insurance, intramurals, use of physical education facilities, graduate parking permits, and discount admission to sporting and cultural events.

ID Center

120-N ELWC, 378-5092

The Identification (ID) Center provides BYU photo identification cards to BYU students. These cards allow students the campus privileges described above. During the first two weeks of each semester or term, the photo ID cards are produced in a designated place in the Wilkinson Center. Thereafter, cards are available at the ID Center. All ID distribution locations also serve as screening areas for the dress and grooming standards outlined by the university.

University Computing Services

167 TMCB, 378-5025

University Computing Services offers an assortment of computing-related services to faculty, staff, and students. In addition to consultation, the following services are provided:

Mainframe systems for use by administrative and academic organizations (University Computing Facilities, 378-4053).

Support of academic and research functions within the university's colleges and departments (Academic Computing Facilities, 378-3617).

Support for the academic community, including the following:

Testing Services, 265 HGB, 378-6129.

Student Computing Support (SCS), 156 TMCB, 378-2089.

Computer training courses for faculty, staff, and students. Recording of scheduled workshops at 378-7246 (37-TRAIN).

Media Services

Managing Director: Dean VanUitert, 290 FB, 378-5999

Providing instructional and technological support for academic and entertainment activities throughout campus, Media Services comprises three main teams offering a complete variety of services. The *Imaging Center* services include graphic design, desktop publishing, presentation graphics, photographic production, consultation, and multimedia presentations. *Operations* provides audio and visual services including delivery of recording, display, and projection equipment, theatrical lighting, video systems, audio recordings (including recordings of forums, devotionals, and firesides at BYU), videotapes, and access to an extensive film and tape collection. *Maintenance* serves to provide the design, installation, and

maintenance of electronic, data, and communications systems.

Veterans Support Office B-150 ASB, 378-2768

The Veterans Support Office certifies the enrollment of eligible veterans or their dependents for educational benefits from the Veterans Administration. Information and assistance in applying for these benefits is available from this office.

Student Life

Opportunities available through the extracurricular division of the university called Student Life are many and varied, ranging from student (BYUSA) functions and activities to counseling and health services.

Dean of Student Life: Maren M. Mouritsen, Assistant Student Life Vice President, 380 SWKT, 378-4668
Associate Dean: Tamara M. Quick, 329 ELWC, 378-3111
Assistant Dean: Wayne R. Herlin, 380 SWKT, 378-4771

Ernest L. Wilkinson Center

The Ernest L. Wilkinson Center is the hearthstone of the campus community, where students may relax and participate in out-of-class activities that foster personal enjoyment and growth. The center is the home for the BYU Student Services Association.

The games center, bowling alleys, copy center, computer facilities, photo studio, barbershop, post office, outdoor rental shop, ID center, and campus lost-and-found service are on the first level. Facilities on the main level include ballrooms, reading rooms and conversation areas, a television area, and movie theater. The Wilkinson Center also includes the university bookstore, a restaurant, snack bar, and cafeteria.

Bookstore

The BYU Bookstore, housed in the Ernest L. Wilkinson Center, offers a variety of merchandise and services to students, faculty, and staff. Textbooks, school supplies, and a large selection of trade books constitute most of the stock, but students can also buy such items as computer hardware and software, art and office supplies, gifts, health and beauty supplies, clothing and sports-wear, CDs and sound equipment, cameras, athletic supplies, and video equipment. The Bookstore offers other services such as check cashing, film processing, UTA bus passes, movie tickets, and a shipping and packaging service.

Religious Opportunities

Students have many excellent opportunities to participate in religious activities at BYU.

BYU Wards and Stakes. The Church of Jesus Christ of Latter-day Saints is organized on campus into a number of stakes composed of several wards (congregations) of 150 to 175 members each. The stakes and wards are organized specifically to give individuals maximum opportunity for Church activity. Spiritual growth and a strong testimony of the divinity of Jesus Christ are goals

fostered by the campus stake and ward organizations, whose programs are correlated at all levels with the activities of the university.

All single students living away from home who are members of The Church of Jesus Christ of Latter-day Saints become members of one of the BYU wards. Married students not living in university housing may attend either a BYU ward or the city ward in which they live.

Other Religious Denominations. Approximately 25 other religious denominations are represented by BYU students. These students are encouraged to attend the congregation of their faith in the Provo area.

Devotionals and Firesides. On selected Tuesdays at 11 a.m., General Authorities and other Church leaders speak to general assemblies of faculty and students in the Marriott Center. Their messages encourage commitment, faith, and adherence to Church standards. Once a month in the Marriott Center, usually the first Sunday evening, Church leaders speak to students in services sponsored by the Church Educational System. Many of these fireside services are broadcast live on the Church satellite television network to Institutes of Religion throughout the United States and Canada.

Student Health Center

Director: Denton J. Cameron, 167 MHC, 378-7443

Student health services are available to all students at the Howard S. McDonald Student Health Center. Hospitalization, when necessary, is available locally at the Utah Valley Regional Medical Center. The Health Center offers urgent care, consultation with physicians by appointment, immunization, pharmacy service, physical therapy, laboratory tests, and X-ray examinations. Also, a brochure describing student health and insurance plans is available at the Health Center.

Counseling and Development Center

Director: David M. Sorenson, 149 SWKT, 378-3035

The Counseling and Development Center provides counseling, instruction, and support that includes:

- Academic Support
- Career Counseling and Information
- Open Major Advisement
- Personal and Group Counseling
- Services to Students with Disabilities
- Services to Students with Learning Disabilities
- Women's Services and Resources
- 24-hour Emergency Counseling

Multicultural Student Services

Director: Rush Sumpter, 329 ELWC, 378-3111

Multicultural Student Services publishes the *Eagle's Eye*, supports the Lamanite Generation, and helps American minority and international students succeed in college work by providing the following support services:

1. International Student Office, 350 SWKT, 378-2695

This office provides visa support, advisement and services to all international students, visitors, exchange scholars; aliens with permanent residence

in the United States; and other interested parties within the university community.

2. **Academic Support Office**, 350 SWKT, 378-3821
This office offers personal encouragement and academic advisement to all international and American minority students.
3. **Financial Aid**, 353 ELWC, 378-3065
The office assists American minority students in securing financial aid.

Services to Students with Disabilities

160 SWKT, 378-2767

BYU offers a variety of services for students with physical or learning disabilities. Hearing-impaired students have access to classroom interpreters, Com-Teks, and TDD communications. Visually impaired students are provided with volunteer readers, Visualteks, a talking computer with enlarged screen print, taped textbooks, and braille writers. Mobility-impaired students receive academic counseling and advisement and help with arranging access to buildings on campus. Learning disabled students are helped by free assessment, volunteer readers, taped textbooks, and other appropriate services.

Ombudsman

BYUSA, 447 ELWC, 378-4132

The Ombudsman's Office investigates and expresses conclusions when a student is aggrieved by an official's action or inaction and acts as an impartial mediator in resolving disputes between students and businesses, organizations, or individuals. Basic legal advice is also provided by this office.

Honor Code Council

Advisor: Tom Kallunki, 366 SWKT, 378-3758

In 1990 the BYU Board of Trustees approved an update of the Honor Code and the Dress and Grooming Standards. An important part of that revision was the creation of the student Honor Code Council. The council has three primary objectives: (1) educate the members of the campus community on matters related to the Honor Code and associated standards, (2) work with students who have difficulties in abiding by the precepts of certain portions of the code, and (3) develop policies and procedures related to the activities of the HCC.

Student Service Association (BYUSA)

4th Floor, ELWC, 378-3901

The mission of the Student Service Association is to strengthen students in their social relationships, civic duty, and service to mankind. Through student leadership, the university community works together to achieve our goal that all who "enter to learn" will be prepared by training and experience to "go forth to serve."

The association consists of five branches which are made up of student volunteers and officers. The *Student Advisory Council (SAC)* consists of student representatives, elected and appointed, from each college on campus. Most student activities and events are planned through *Campus Life*. *Community Service* matches volunteers with service opportunities on and off campus. *University Relations* helps to bind together all the on-

campus student organizations and clubs. The *Administrative Branch* supports and binds the other branches together.

All Brigham Young University students are invited to participate or plan any of the numerous programs and activities that are available through BYUSA. For further information on involvement opportunities contact the Involvement Office or BYUSA at 378-3901.

University Police and Traffic

B-66 ASB, 378-2222 (Emergency: 911)

The University Police Department is established for the benefit and protection of students, faculty, and staff. The department's state-certified police officers are entrusted with enforcing laws and campus rules and regulations.

All routine matters requiring police assistance should be directed to this office.

Vehicle Registration and Parking Permits

GRNH, 378-3906

Parking and traffic control are the responsibility of the University Police Traffic Services, located in the Traffic Office east of the Carillon Bell Tower on 1430 North. All BYU students who intend to park in student lots during restricted hours (7 a.m.-4 p.m. Monday through Friday) must register their motor vehicles with the Traffic Division and obtain a parking permit.

To purchase a permit, bring your current vehicle registration, proof of emissions compliance, and BYU ID to the Traffic Office.

Out-of-State Plates

Effective June 1993, nonresident permits are no longer required for out-of-state plates.

Bicycle Registration

All bicycles that are operated, parked, or stored on campus by any student, employee, or visitor must display a current bicycle license from a Utah County city. The fee for a Provo bicycle license is \$1. Provo city bicycle licenses can be obtained at the Traffic Office or at the Provo City Center, 359 West Center.

Bicycles may not be ridden on the main campus during class breaks. They must be parked in authorized bicycle racks. Bicycle locks, chains, or cables may not be cut unless a uniformed police officer or traffic officer is present.

Other Regulations

Additional information about traffic and bicycle rules and regulations is available at the Traffic Office. All students, faculty, and staff members are responsible for knowing this information.

Housing

Housing Office 100 SASB, 378-2611

Student housing is available both on campus and in the surrounding communities; policies have been established within campus residence halls and with off-campus landlords to integrate living experiences with the complete educational experience.

Campus Housing: Single Students

Campus housing for single students includes room-and-board residence halls and apartment-type facilities. Each hall contains student rooms, study rooms, recreation areas, central shower areas, laundry and storage facilities, and a head resident apartment. The central buildings for Desert Towers and Helaman Halls feature cafeterias, dining rooms, reception areas, computer rooms, and a reading and writing laboratory for the entire residence area.

Heritage Halls provides housing for women and men in twenty-four apartment-type buildings. Each apartment has a combination kitchen-dining-study room, three bedrooms, and a bath. In addition, there are large living rooms, a recreation room, a head resident apartment, and laundry and storage facilities in each building. Usually, six people live in each apartment. The apartments are completely furnished except for bedding and kitchen items.

Another option for single students is the Foreign Language Student Residence. The College of Humanities sponsors the new residence, located near the Missionary Training Center. Students pledge to speak only the foreign language in their apartment while they live and study together under the supervision of a faculty advisor and a native speaker. Participating graduate students sometimes serve as interns or instructors in these apartments. All rooms are double rooms, and male and female students eat together, with the cost of meals included in the fees. For details write to one of the foreign language departments listed in this catalog or to the coordinator of the Foreign Language Student Residence, 4088 JKHB.

Campus Housing: Student Families

Family accommodations for 1,048 student families are provided in Wymount Terrace and Wyview Park. Wymount Terrace consists of family apartments arranged around lawn areas and playgrounds. Each apartment is furnished with an electric or gas range, refrigerator, drapes, and garbage disposal. A limited amount of furniture is available for rent from the university. These apartments are not plumbed or wired for washers and dryers, but the complex has five self-service laundry centers. Four apartment sizes are available, assigned according to family size.

Wyview Park consists of one-, two-, and three-bedroom mobile homes placed on permanent foundations

and connected to power, water, and sewer lines to provide the conveniences of permanent homes. Each unit is equipped with air conditioning, refrigerator, garbage disposal, built-in gas range, carpeting in the living room and bedrooms, and built-in chests of drawers. A laundromat, children's play area, adult recreation area, community assembly room, community park, and dairy products outlet are also all nearby.

Applications for Campus Housing

Students who plan to enroll at BYU and live in a university residence hall or a student family complex are advised to obtain the appropriate housing application from the Office of Student Housing at least one year in advance.

The completed application should then be returned to the university with the appropriate nonrefundable fee: \$50 for single student housing and \$25 for family student housing. Housing assignments and agreement forms are prepared according to the date the application is received by the Housing Office.

Validation of any campus housing reservation is, of course, contingent upon the student's official acceptance and admission to the university. Agreements are usually made for the academic school year (two semesters).

Off-Campus Housing 255 ELWC, 378-5066

The BYU Off-Campus Housing Office aids students in finding off-campus housing, encourages landlords of university-approved housing to maintain and improve rental facilities, advises students and landlords in their relationships with one another, and attempts to assure that BYU living standards are maintained in university-approved off-campus rentals. BYU graduate students are encouraged, but not required, to live in university-approved housing. At present, more than 24,000 rental spaces have been approved by the university for off-campus living.

BYU Housing Referral Service

The Off-Campus Housing Office maintains a complete referral service for all university-approved rental facilities. Thousands of rental units of all types are available, including large apartment complexes, condominiums, duplexes, houses, basement apartments, and sleeping rooms. Some housing for student families is also listed, though family student housing is not subject to university approval.

Detailed lists of current vacancies are available at the Off-Campus Housing Office, 255 ELWC from 8 a.m. to 5 p.m. Monday through Friday. Because such lists are constantly updated, they are not sent to prospective renters through the mail. However, a guide with essential rental data on the large apartment complexes will be mailed on request. Consultants are also available to help students who have problems finding suitable off-campus housing.

Catalog Terms and Abbreviations

The following terms and abbreviations are used throughout the catalog.

Course Number. This catalog does not list courses numbered below 500. For listings of undergraduate courses, see the BYU Undergraduate Catalog. Courses numbered below 500 are undergraduate courses, courses numbered 500–599 are either graduate courses or advanced undergraduate courses, and courses numbered 600 and above (600–799) are graduate courses. Most, but not all, 500-level courses can count toward a graduate degree. Restrictions and limitations are noted in the Credit Policies section of this catalog and also in the program requirements for each department.

Credit Hour Designation. The number that follows each course title is the number of semester hours of credit designated for the class.

Abbreviations and Symbols. The following abbreviations and symbols are used in the course listings:

Abbreviations	Designation
Arr.	Credit, class, or laboratory hours are arranged through consultation with department or instructor
ea.	Credit hour designation applies to each registration
R	Designates a course that may be repeated for credit
□	Cross-referenced course—one that originates in one department but may count for credit in another
(19 _)	Date faculty member was hired
Alt. sem.	Course is offered alternate semesters
Alt. term	Course is offered alternate terms
Alt. yr.	Course is offered alternate years
Even yr.	Course is offered even years
Odd yr.	Course is offered odd years
On dem.	Course is offered “on demand,” that is, when enough students request it to justify offering it

Areas of Study	Abbreviations	Areas of Study	Abbreviations
Accounting	Acc	History	Hist
Agronomy and Horticulture	AgHrt	Humanities	Hum
Animal Science	AnSc	Classics	Clscs
Anthropology	Anthr	Comparative Literature	CLit
Art	Art	Instructional Science	IS
Botany and Range Science	Botny, Range	International and Area Studies	IAS
Chemical Engineering	ChEn	Languages	
Chemistry	Chem	Arabic	Arab
Civil and Environmental Engineering	CEEn	Chinese	Chin
Clothing and Textiles	CITx	French	Fren
Communications	Comms	German	Germ
Computer Science	CS	Hebrew	Heb
Dance	Dance	Italian	Ital
Design	Des	Portuguese	Port
Economics	Econ	Russian	Russ
Educational Leadership	ELdr	Scandinavian	Scand
Educational Psychology	EPsy	Spanish	Span
Elementary Education	ElEd	Law School	Law
Electrical and Computer Engineering	ECEn	Linguistics	Ling
English	Engl	Teaching English as a Second Language	
Family Sciences	FamSc	Management Communication	MCom
Food Science and Nutrition	FSN	Managerial Economics	ManEc
Geography	Geog	Manufacturing Engineering and Engineering Technology	MFET
Geology	Geol		
Health Sciences	Hlth		

Areas of Study	Abbreviations	Areas of Study	Abbreviations
Mathematics	Math	Religious Education	ReLA
Mechanical Engineering	MeEn	Ancient Scripture	ReIC
Microbiology	McBio	Church History and Doctrine	SeEd
Nursing	Nurs	Secondary Education	SocW
Organizational Behavior	OrgB	Social Work	Soc
Philosophy	Phil	Sociology	Stat
Physical Education	PE	Statistics	TecE
Physics and Astronomy	PhScs	Technology Education	ThF
Psychology	Psych	Theatre and Film	Zool
Political Science	PlSc	Zoology	
Public Management, Institute of Recreation Management and Youth Leadership	PMgt	RMYL	

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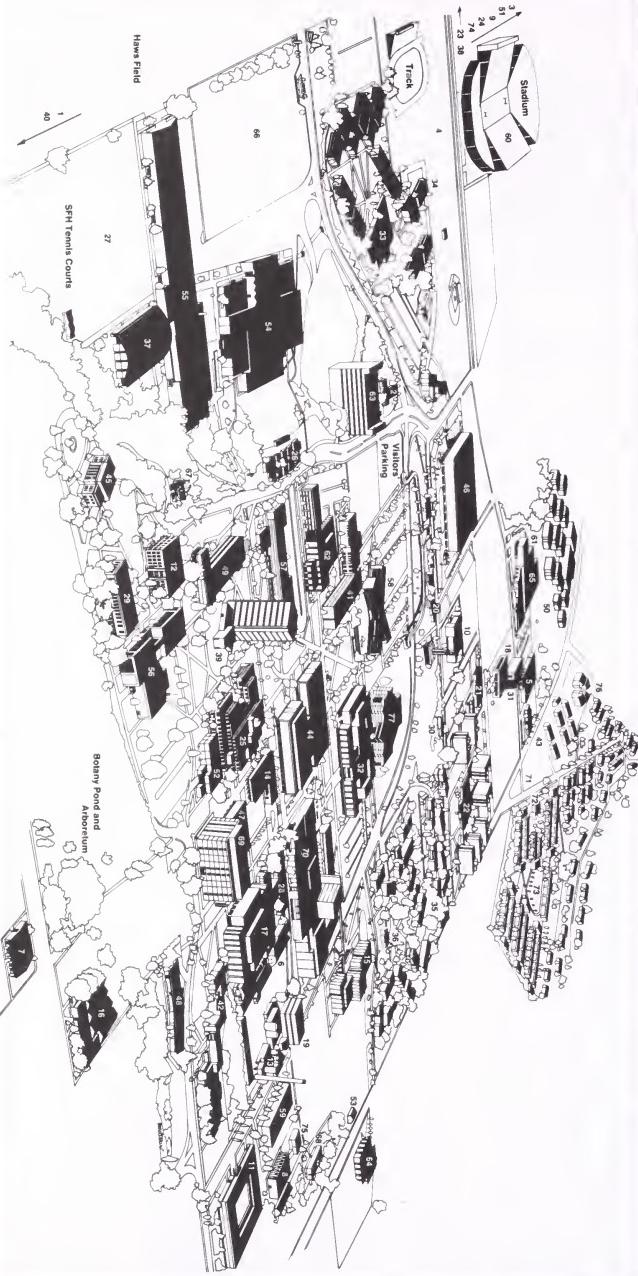
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BRIGHAM YOUNG UNIVERSITY CAMPUS

AMB	Ambulance
B-17 to B-41	Auxiliary Maintenance Building
B-49	Messengers' Temp. (Temp. Barracks)
B-65	(Service Classroom Building)
B-67	(Research) Service Building
BRMB	Bomber Building
BWBW	Brewer Building
CANC	Sam F. Eard Grounds
CB	CB Company
CLFB	Clock Engineering Building
	Building W W
	Curt J. Part Science

Lee Library	John Bold	D-3	44
Human Relations	Harold Johnson	D-3	45
Education Center	Edmund F. Johnson	D-3	31
Finance & Art Center	Franklin S. Frank	E-2	32
Golf Building	George Hall	D-2	49
Huntington Hall	Herbert Hall	E-2	33
Cook Building	Heath Hall	E-2	33
Heard Hall	Heard Hall	E-3	14
Herrings Hall Central	Herrings Hall Central	F-2	36
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Cook Hall	Jess Cook	F-2	15
J. Reuben Clark Building	J. Reuben Clark Building	D-3	34
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Saint Joseph	Saint Joseph	D-3	34

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William H	3	48
Kotter T	3	47
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Indoor T	1	45
Taylor M	2	44
Sammy M	2	43
Bunting C	1	42
Tanner B	1	41
N. Elton	1	40
University	1	39
Vessels C	1	38
Wiggo S	1	37
A. John (S)	1	36
Wyrum J	1	35
Kommers D	1	34
Wheeler P	1	33
Wynona P	1	32
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